# WOOD WORKING Digest

**AUGUST**
**1955**

**In This Issue . . .**


- Washington News
- Finishing Stories
- Fundamentals of Wood Machining
- The Furniture Fair
- Complete index



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THE INDUSTRY'S *No. 1* PUBLICATION *in*

- Editorial Content
- Advertising Volume
- Effective Circulation

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*SINCE 1898*


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CATALOGUE & ORDER DEPT
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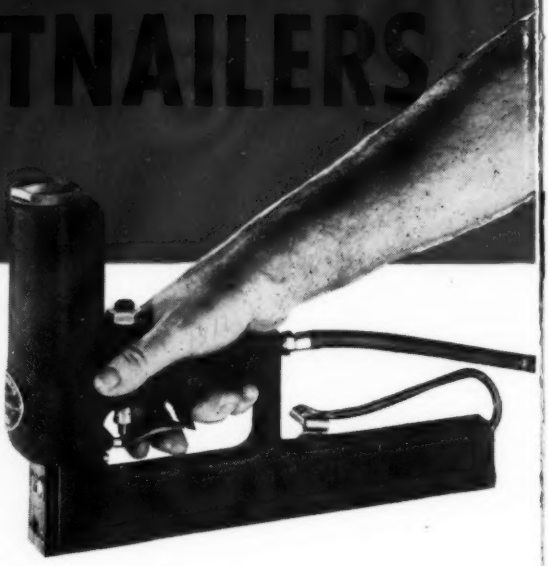
# Air Drive

## High Velocity Non-Recoil SPOTNAILERS

FIRE LONG FASTENERS
INTO HARDEST WOODS
with 100 P. S. I. or less

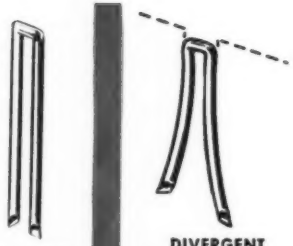


All the heavy duty fastening jobs so ably performed for years by manually operated Spotnailers now can also be done with the super speed and convenience of air.

The new Models PEL and PHL Spotnailers are beautifully balanced tools which may be operated at arms length because no effort is required except to position the gun and operate the trigger — astonishing to those accustomed to using air guns that must be held tightly to the work. It opens up great new opportunities for cost saving fastening.

Most millwork and furniture fastening jobs can be done more profitably with Spotnailers. See your local Spotnail Man. His experience can help you.

- ★ HIGH VELOCITY NO-BOUNCE ACTION
- ★ LOW HANDLE EXCELLENT BALANCE
- ★ LIGHT WEIGHT REDUCES FATIGUE
- ★ DRIVES 16 or 18 GAUGE 1-3/16" LONG FASTENERS
- ★ LARGER, INSTANT-LOAD MAGAZINE HOLDS 200 FASTENERS
- ★ COUNTER SINKING TO SUIT – GUIDE PLATES



No. 99DC
1⅛" Long

DIVERGENT CHISEL POINTS

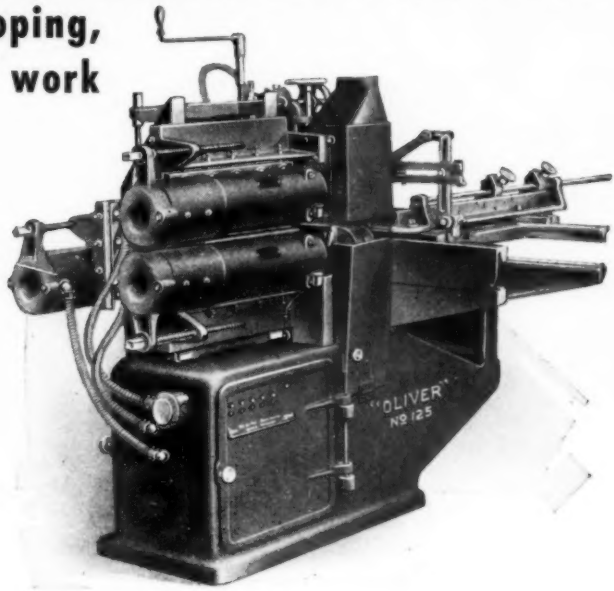
WRITE FOR COMPLETE INFORMATION
SPOTNAILS, INC.
EVANSTON 1, ILL.

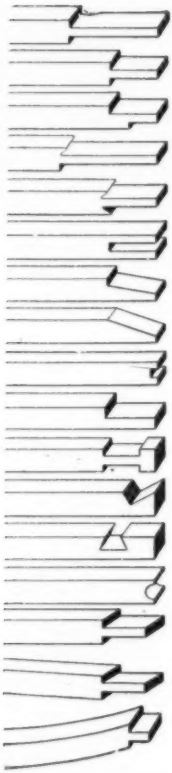
HD-9-DC
1⅛" Long

SPOTNAILS, INC.

# "OLIVER" SINGLE END TENONER

## . . . unmatched for fast, accurate, low-cost tenoning, coping, and cut-off work



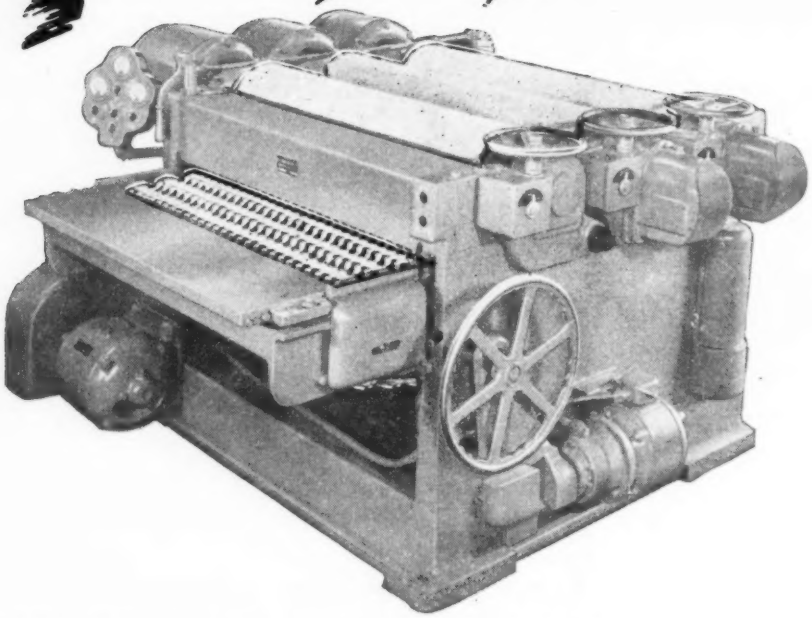
## Easily and quickly adjusted

This "Oliver" is known for its versatility. It handles many everyday jobs readily. Not only is it the fastest Tenoner in its field, but you can adjust it quickly. Heads are adjusted by screws having 16 threads per inch—a quarter-turn adjusts head 1/64". Has two tenon heads on horizontal arbors, two vertical cope heads, one horizontal saw arbor. All have motor-on-arbor drive, adjustable vertically and horizontally. Table tilts up to 15° for angular work, and is fitted with complete gauges and clamps. Cuts tenons 7" long with one cut, 10" with two cuts, 6" thick, 24" wide. Cuts off stock 42" wide; makes double or triple tenons 4" deep. Can be used as saw tenoner to work tenons 4" long, 6" thick, 24" wide. **Write for Bulletin No. 125-D.**

**OLIVER MACHINERY COMPANY**
**Established 1890** **GRAND RAPIDS 2, MICHIGAN**

# THE SMITH ENDLESS BED SANDER

WITH SELF-OSCILLATING DRUMS AND VARIABLE SPEED DRIVE, 12' TO 35' PER MINUTE



**Self oscillating mechanism,** quarter inch stroke, 144 strokes per minute.

An exclusive feature found only on the **Smith** machine.

An example of the tradition of building only the **best in** woodworking machinery **for over 108 years.**

There are many other exclusive features built into the **Smith 2, 3, and 4 Drum Endless Bed Sanders** that **you** should investigate.

Just write and say "I want more information about the **Smith Endless Bed Drum Sanders** and tell me about your **lease plan** also".

WOODWORKING MACHINERY MANUFACTURERS ASSOCIATION WMMA

## H. B. SMITH MACHINE CO.

SMITHVILLE

**BURLINGTON COUNTY** **NEW JERSEY**

WOOD WORKING Digest

AUGUST, 1955
Vol. 57, No.8

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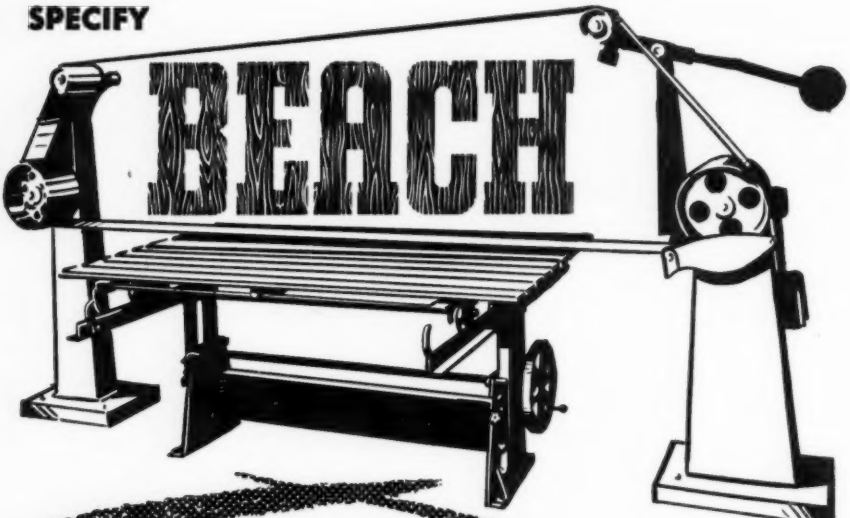
**SPECIFY**

# BEACH



## HAND BLOCK BELT SANDER

Designed and built to give uninterrupted, trouble-free service, this versatile machine solves a variety of finishing operations – for sanding and finishing wood products; and for products made from aluminum, brass, bronze, stainless steel and plastics. Sturdily built, 42" x 80" table mounted on anti-friction rollers; standard 2 HP, 2 or 3 phase ball-bearing motor.

The Beach Hand Block Belt Sander is already in use by over 1000 leading industrial firms! You will be amazed at the economical, efficient operation . . . the initial low cost!

**Only $595. F.O.B. factory.**

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TILTING TABLE SAW

SHAPER

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**MANUFACTURING CO.**
**MONTROSE, PA.**

*Write today-*

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# WALTERS automatic handling has paid off for . . .

With labor approaching materials as a factor in manufacturing cost it is more important than ever before to use manpower **only where manpower is needed.**

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Walters is the only concern in the world devoted exclusively to making materials-handling equipment for the woodworking industry. 28 years experience in the field plus top engineering know-how offer an unbeatable combination for lowering cost and increasing production.

Your production-line problems are unlike anyone else's. That's why it's best to let the Walters representative personally explain how Walters mechanization is engineered to your plant.

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MAIL THIS COUPON NOW TO FIND OUT WHAT WE CAN DO FOR YOU!

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MORRISTOWN TENNESSEE SINCE 1927

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## USMC AUTOMATIC POWER TACKER

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**USMC "POP" RIVETS** For metal furniture, appliances, kitchen cabinets, TV and radio receivers, etc. . . . an economical, high production blind fastening. Combines great strength and high clinching power.

**FEATURES:** One operator, halves labor costs. Can set 1200 rivets per hour. Produces strong joints with unskilled operators. Ideal in corners, tight spots. Eliminates hammer dents. Permits use of thinner metal. Other advantages: Rivets available in monel and aluminum, with domed or countersunk heads. Diameters: 1/8", 5/32" and 3/16".

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Speed 100-150 nails per minute. For case backs, crate closing, cleating, drawer runner, corner bracers, drawer stops. Production trial model now in operation.

**2 Automatic Power Screw Driver** Feeds and drives screws vertically, horizontally or at any angle — often without pre-drilling.

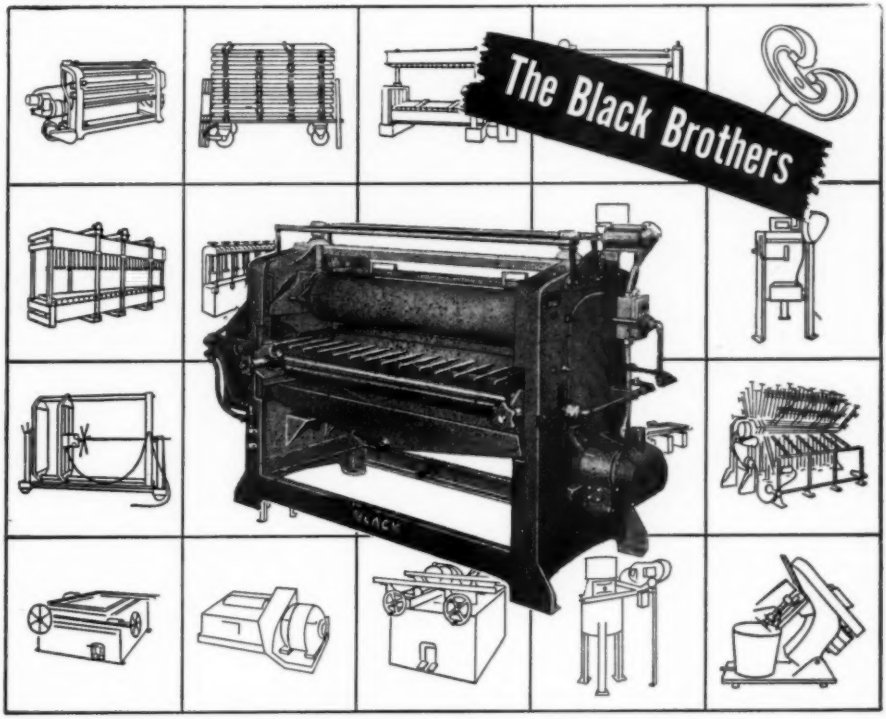
One hand is free for holding work or other use. Average speed — 60 screws per minute maximum with 1" long screws. Same uses as nailer.

*For further information write Industrial Sales Division*

**UNITED SHOE MACHINERY CORPORATION**
BOSTON, MASSACHUSETTS

Send Inquiries on "POP" Rivets to "POP" Rivet Division, West Medway, Massachusetts

***Be sure to see these 4 tools in operation at NAFM Supply, Equipment and Fabric Fair***




# A Complete Line of Laminating & Gluing Equipment

Black Brothers manufacture a complete line of laminating and gluing equipment of nationally recognized superiority. Illustrated above is a No. 22-D resilient roll, ball bearing glue spreader equipped with water cooled doctor rolls as an optional extra for use with quick setting glues. Gluing rolls are deeply covered with fine synthetic rubber, and are specially grooved to control the amount of resins deposited and to conform to irregularities in the veneer. Accurate, heavy duty ball bearings are sealed to keep lubricants in, and dirt and glue out. Black's 22-D Spreader for resins, casein, and other cold glues is unmatched in speed, economy, accuracy, cleanliness and quality production. Write for details today . . . or let us send you a catalog on the complete Black line.

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*Manufacturers of Internal Fan Kilns*

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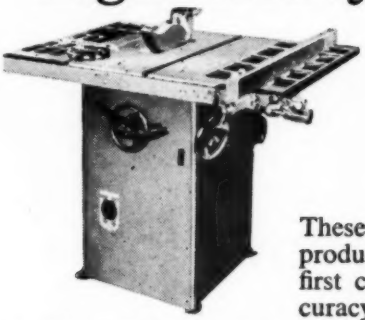
# These **NEW** Walker-Turner "Light-Heavyweights" give you



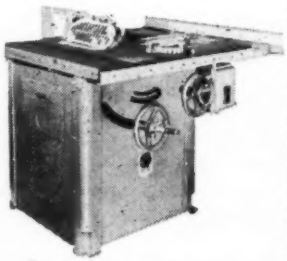
## BIG MACHINE PERFORMANCE at LOWER COST

These rugged new saws slice right through your production costs . . . start earning their way the first cut you make. Here's performance and accuracy you'd normally find only in much heavier, more expensive machines.

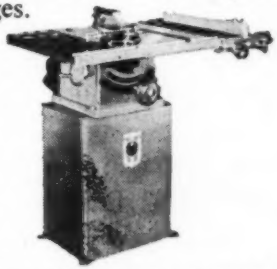
Faster, smoother production cutting is built right into these new Walker-Turners! Motor mounting and arbor *tilt as a unit*. Guard and splitter are always lined up with the blade for protection at any angle. Saw arbors mounted on precision ball bearings on all models.

Ask your Walker-Turner Distributor for complete specification sheet, and a demonstration of what these new saws will do for *you*. He's there to help you. You'll find him listed under "Tools" in your phone book's Yellow Pages.

**No. 2221 — 10" Tilting Arbor Saw** — Capacity: 3⅛" with 10" blade; 2⅛" at 45°; with 6" dado, 1⅛". Speed: 3800 rpm. Table: 32½" deep x 32" wide; 32½" x 45¾" with extensions. With 10" combination blade, extension tables, miter gauge, guard, splitter, motor pulley and belt (without motor) $297.00.



**No. 2450 — 14" Tilting Arbor Saw** — Capacity: 5" with 14" blade, 3½" at 45°; with 8" dado, 2". Speed: 3450 rpm. Table: 38¾" deep x 48" wide with extension. With 14" combination blade, extension table, miter gauge, splitter, guard, including 5 hp 220/440 volt 60 cycle 3-phase motor, with push button station. $946.50.



**No. 2121 — 8" Tilting Arbor Saw** — Capacity: 2⅝" with 8" blade, 1½" at 45°; with 6" dado, 1⅝". Spindle speed: 4000 rpm. Table: 23" deep, 19" wide; 23" x 37" with extensions. With 8" blade, extension tables, miter gauge, guard, splitter, belt, motor pulley and sub base (without motor) $192.00.

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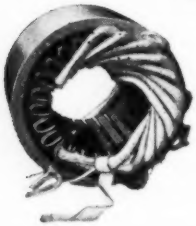
**To Motorize**
**is to Modernize . . .**

**To Modernize**
**is to Economize.**



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**Each individual coil of the winding is insulated and separated by a double layer of insulated tape.**

Slipping belts and defective motors may be costing you more than you think! At surprisingly small expense, highly efficient ball bearing Wood's Motor Arbors or Shaftless Motors can be installed to provide real economy and top performance.

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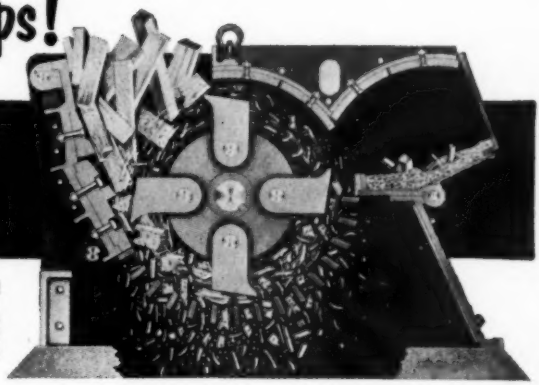
# These Machines Make Money From Wood Chips!

## WILLIAMS "No Nife" HOGS



Cross section of "No-Nife" Hog showing how fast-revolving chisel-edge hammers reduce wood by impact until properly sized to pass through grate at bottom of machine.

**A GROWING MARKET FOR WOOD CHIPS!** The production of many types of Chip Board for use in the booming building industry has created a vast new market within the past few years. And the demand for this versatile building material keeps growing daily.

**TURN WASTE WOOD INTO MONEY!** Chip Board offers a tremendous outlet for chips made from wood waste, providing the chips can meet manufacturers' requirements for quality, size and uniformity. As the most satisfactory equipment for producing chips to specifications, a Williams Hog literally pays for itself by turning out a top quality product commanding highest selling prices.

**GET THE FACTS!** Williams Hogs are noted for maximum production at lowest cost. *Completely Automatic Installations* have made exceptional profits in the grinding, separating and packaging of wood chips, as well as wood flour and sawdust. *Write today for information!*

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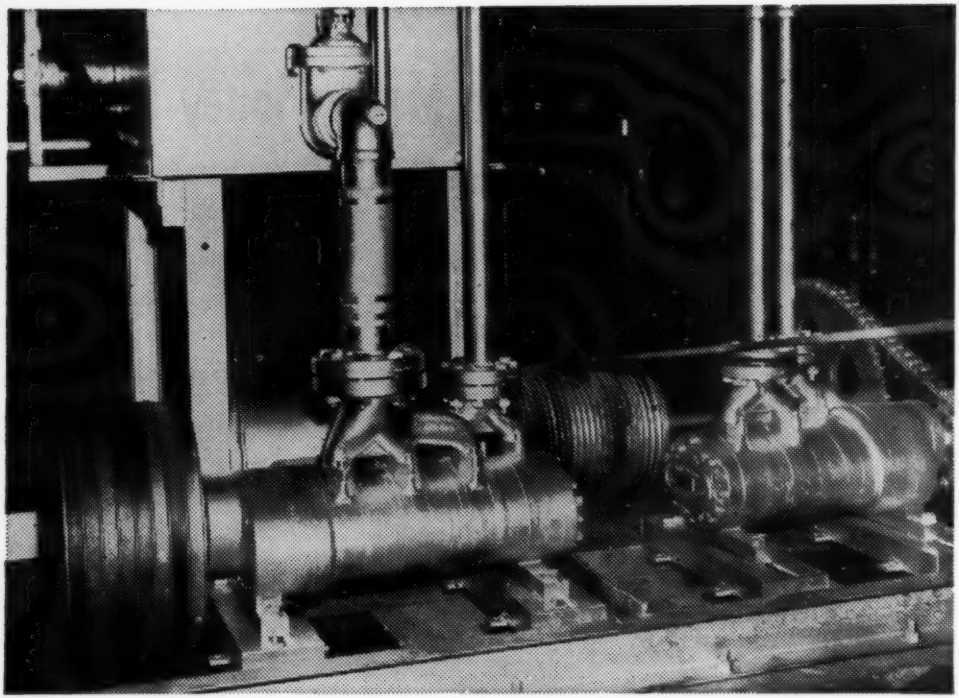

# BERRY® Hydraulic Carriage Feed

## FASTEST RETURN! FINGERTIP CONTROL!

**Photo above**

Shows a Berry Pump, Motor and fluid reservoir in a mill of the Keewatin Lumber Company, Keewatin, Minn.

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You can get complete details of the new Berry drives from our Portland office.

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# DOUBLE SURFACER

## For quality production and low cost planing

**Whitney 97 Double Surfacer**
Feeds: 30 to 90 feet per minute
Planes stock ⅛" to 7" thick
Widths, 30" 36" 40" and 44"

The Whitney 97 Double Surfacer, the last word in modern planer design, is built to handle your double surfacing requirements. Its rugged proportions and faster feeds permit it to handle easily the volume production required in today's modern plant. Traditional Whitney accuracy and careful workmanship assure smooth, accurate planing, continuous production, low cost maintenance and the stamina to produce best results under the severest kind of service.

The Whitney 97 will bring to your plant a new conception of production efficiency and cost savings. High production quotas will be maintained and sanding and finishing costs substantially reduced. Investigate today the Whitney 97 for your double surfacing requirements. Write for full particulars. Ask for planer bulletin D 1.

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- Wedge Construction
- Nitralloy Center Table
- Ball and Roller Bearings thruout
- Motor Raising and Lowering of Bed
- Built-in Variable Speed Feed
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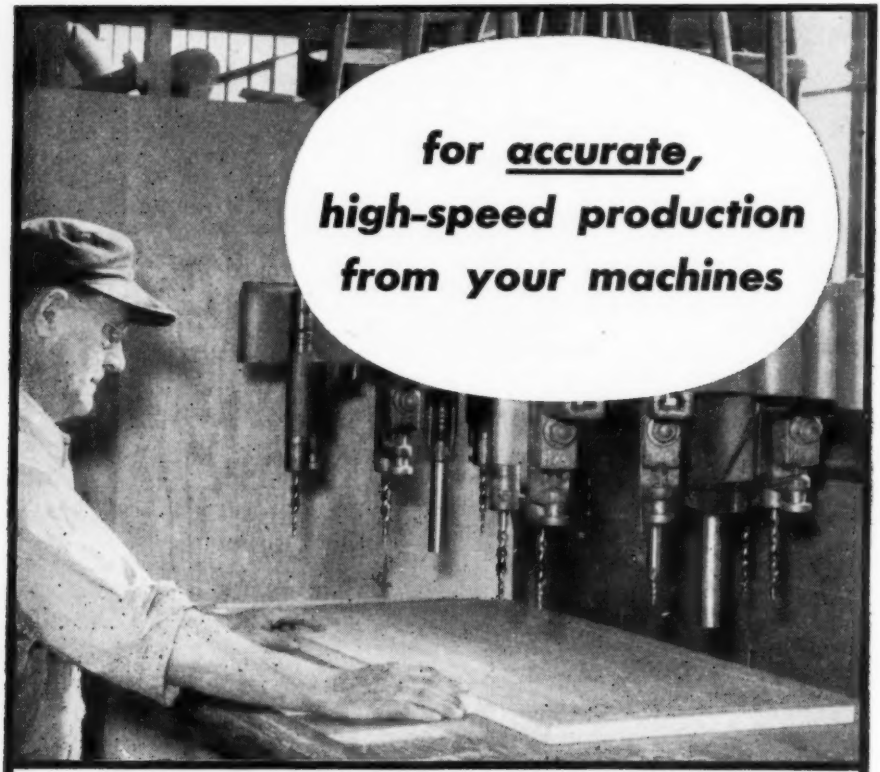


## get GREENLEE high-quality boring tools

Produced by the makers of fine woodworking machines, GREENLEE boring tools are designed and built specifically to handle fast work . . . stand up under long, hard usage . . . bore clean. Each tool has accurate sizing, sharp cutting edges, proper heat-treating to bring you high-speed, highly accurate production. Line includes Machine Bits, Machine Drills, Dowel Bits and Drills, Countersink Bits and Drills, Multi-Spur Machine Bits, Expansive Bits, Plug Cutters, Relishing Bits, and others. To get the finest results from your machines "get GREENLEE." Write today for Catalog 34-M with complete data.

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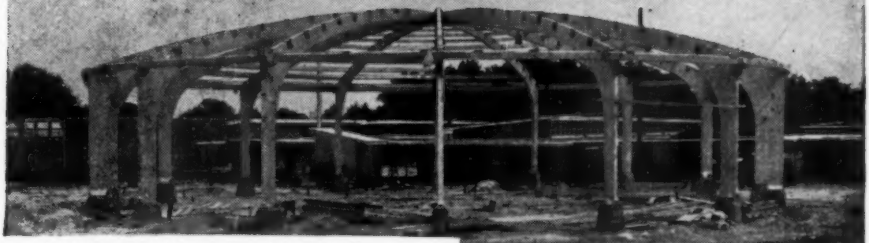
# Laminated arches...PENACOLITE®-Bonded

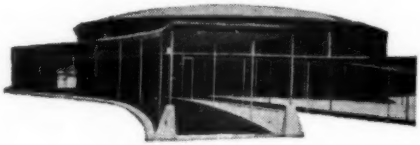
## • provide strength, safe construction, weather resistance in ultra-modern Florida school buildings



Cocoa High School Auditorium, Cocoa, Florida
Architects: Griffin and Gomon, Daytona Beach, Florida
Contractor: Edward M. Fleming, Miami

The beautiful new auditorium and gymnasium at the Cocoa High School in Cocoa, Florida, are good examples of how laminated wooden structural members are being used in modern buildings. The arches and beams in these two school buildings were designed and manufactured by Unit Structures, Inc., of Peshtigo, Wisconsin, and were laminated with "Penacolite" Adhesives, made by Koppers.

These arches give great structural strength without excessive weight. A completely functional design was possible in these buildings because large areas could be spanned (96' in the auditorium, 128' in the gym) without sacrificing any of the valuable floor space for supporting posts . . . the base of each arch is *outside* the building.



All the laminating was done with "Penacolite" Adhesives because they form bonds as strong as the wood itself – bonds that can be counted upon to *maintain* their strength despite age, exposure to water and weather, stress and strain, or temperature extremes.

"Penacolite" Adhesives are easy to use too. They cure quickly–in a few hours at room temperature, or in just a few minutes at higher temperatures. For all the facts on "Penacolite" Adhesives and their many uses, write to Koppers for free, illustrated literature.

**KOPPERS COMPANY, INC.**

Chemical Division, Dept. WD-85 Koppers Bldg., Pittsburgh 19, Pennsylvania

KOPPERS®

**PENACOLITE® RESORCINOL ADHESIVES**

*The original waterproof, room-temperature-setting adhesives*

*1955 Cadillac for your '29 Ford?*

*21" picture screen for your old 12"?*

*Automatic Bendix for your old washboard?*

no...

**It's a new and completely different kind of offer!**

# Thermatron

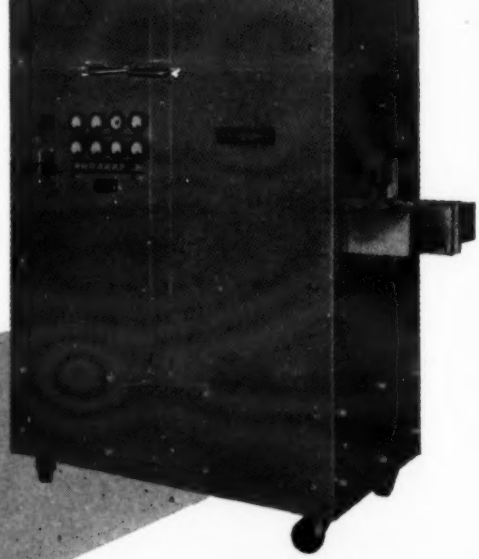
**will give a**

**LIBERAL TRADE-IN ALLOWANCE on your old, smaller high frequency generators...from hand guns up!**

You've wanted newer, larger and more automatic equipment for your electronic edge bonding and wood gluing operations
But your present investment and the

You've wanted newer, larger and more automatic equipment for your electronic edge bonding and wood gluing operations . . . But your present investment and the additional cash outlay needed was too big for your budget.

NOW, Thermatron offers a plan whereby you can turn in your present high frequency equipment for a liberal allowance toward newer, larger units that increase production and cut costs.



THERMATRON

*for*

- Edge Bonding
- Glue Drying
- Plastic Sealing

*. . . and many other applications*

Thermatron 20 KW High Frequency Generator with automatic controls, specially designed for high production edge bonding. In actual operation, together with a batch-type press, Thermatron's automatic power control has reduced edge bonding production time over previous electronic installations by at least 33⅓%

*For complete information, write or telephone now to Dept.* WD-49

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*In Radio and Electronics Since 1922*

SALES OFFICES: 251 West 19th St., New York 11, N. Y. WAtkins 4-3633
Chicago: 2753 West North Ave.
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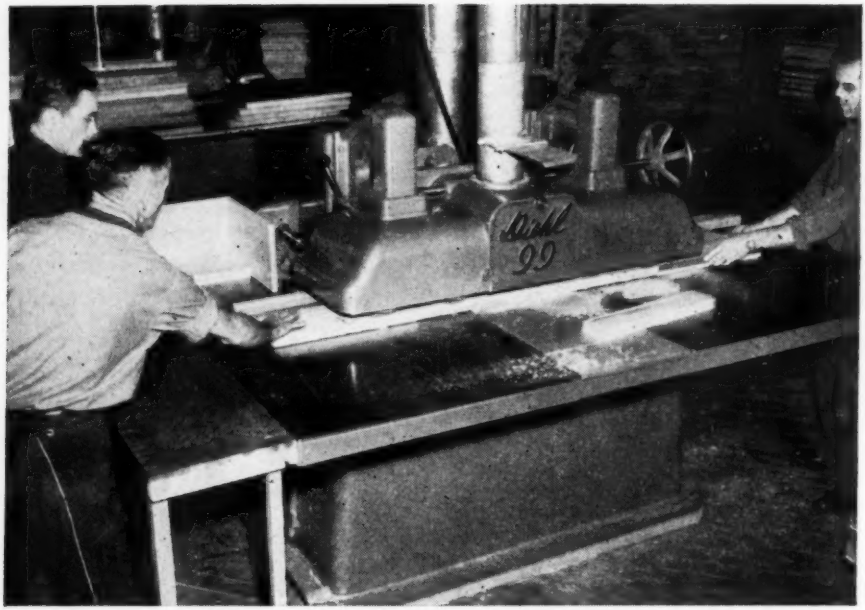
Thermatron




# "We've saved $14,694 in only one year by reducing waste 24%," *Reports Joe Shuman, Plant Manager, Darlington Veneer Co., Darlington, S. C.*

Before installing their Diehl No. 99 Multi-Rip Saw, Darlington Veneer had a disturbing 42% waste in their mill. After using the Diehl 99 for one year, they added up the score and found they had reduced waste by 24%, *resulting in a saving of $14,694!* Joe Shuman, Plant Manager, claims the Diehl Multi-Rip Saw—which gang rips glue joint cores in standard widths, cuts out defects and glues random length stock into block cores—could easily have handled *twice* the work Darlington put through it.

Don't let *your* profits "waste away." See your nearest Exclusive Diehl Representative soon for a demonstration of the Diehl 99 Multi-Rip Saw—or write today, requesting Bulletin No. 99, for all of the facts. **The G. M. Diehl Machine Works, Inc., Wabash, Indiana**

***Standard of Comparison in the Woodworking Industry***

**Diehl**

# FROM COAST TO COAST
## wherever there's woodworking

**there is an Exclusive Diehl Representative ready to serve you!**

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323-9 Dorchester Ave. • Boston 27, Massachusetts • Phone: AN 8-1111

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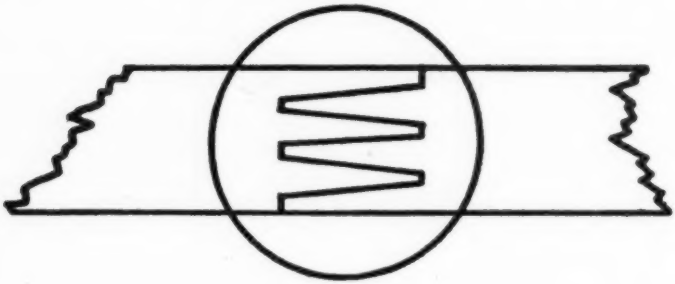
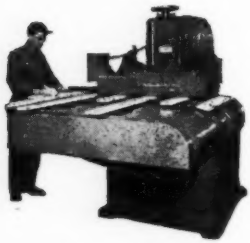
**EXCLUSIVE**
**Diehl**
**REPRESENTATIVES**

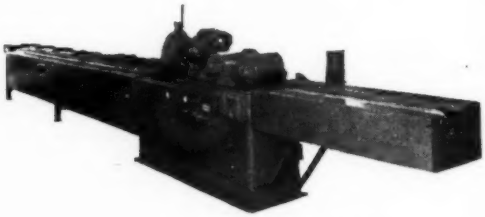
# Continuous Finger Jointing At A Minimum Cost



Continuous production layouts for finger jointing, assembling and cutting to any predetermined length up to 16 ft. For the salvaging of short stock or utilizing a low grade of lumber. Micrometer adjustments for assuring accurate joints. Automatic glue applicator. Write for users list.



*Finger Jointer*



*Assembly Machine*

Exclusive Distribution

**TRI-STATE MACHINERY CO.**
3000 COMMERCE DALLAS, TEXAS
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MANUFACTURED BY

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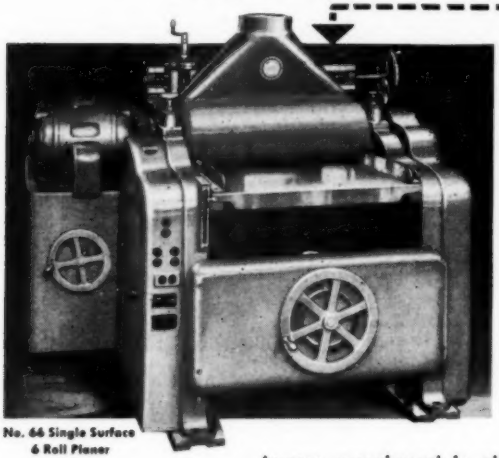
# BUSS Announces...

## Another *NEW* and *HIGHLY IMPORTANT* PATENTED FEATURE!



No. 66 Single Surface 6 Roll Planer

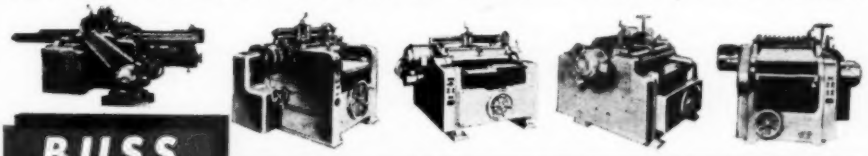
### *INSTANT* MICROMETER CONTROL OF TOP OUTFEED ROLL

Anyone experienced in planing will quickly appreciate the great value of this device which permits instant and absolutely accurate adjustment of the top outfeed roll. It requires just a few seconds for the operator to adjust the roll to the ideal distance below the cutting circle and thus to eliminate a major cause of planer "marking."

Previous to the advent of this micrometer control, adjustment of the top outfeed roll in all planers required individual adjustments under each roll box — a tedious job with varying results. Consequently, too often the roll was left in one position and as the knives wore the roll became too low, stock butted against it and "marking" occurred. And on the other hand, when adjustments were attempted a great deal of time was consumed.

This new, patented feature available on Models 44, 66 is just one of a great many very important developments found EXCLUSIVELY in BUSS cabinet planers — one reason why they will give you the most for your money in fine finish planing. There's a model and size to exactly fit your needs. Write for descriptive bulletins.

### *THERE'S A BUSS PLANER TO EXACTLY SUIT YOUR NEEDS*



**BUSS**
SINCE 1862
MACHINE WORKS

**PLANER SPECIALISTS EXCLUSIVELY**

**234 EIGHTH STREET • HOLLAND, MICHIGAN**

# THE NEW BOICE-CRANE MASTER-MONOTROL* 10-INCH TILTING ARBOR SAW

★ CUTS A BOARD PLUMB SQUARE!

★ RIPS SUPER STRAIGHT!

★ CUTS MITERS THAT REALLY FIT!

## ADDED POWER
## NOW—MOTORS TO 2 H.P.

The only full-powered 10-inch saw. Heretofore, enough power to cut full 3" hardwood in production was usually available only in 12-inch saws. Boice-Crane full powering guarantees freer sawing, reduced hazard of accidental kickbacks when freeing stock from a checked blade.

### Specifications

Saw Blade Travel: 0 to 3¼"
Arbor Speed: 4000 rpm's
Capacity: Cuts off 15" wide, 1" thick
Cuts off 13⅞" wide, 3" thick
Rips to center of 6 ft. wide stock
Arbor: ¾" dia.
Table Size: 36" wide x 27½" long with extensions

## . . . PLUS ALL NEW "ANGLEMASTER" TRUNNION

All trunnion parts, support surfaces, bearings and contacts are oversize, extra rugged. Many parts actually equal in size to those on 12-inch saws.

## Direct Locked Under-Assembly for Higher Precision at the Cut

The entire train of parts from trunnion to arbor lock one upon the other to equal the rigidity and precision of one solid part. All looseness is locked out. Only Master Monotrol has it!

## Single Control for Positioning Blade

New Monotrol* positioning system reduces blade controls to a single large handwheel, plus a height lock and a tilt lock, all mounted on the front—equally convenient for right-handed or left-handed operators! No groping, no out-of-reach controls, fewer accidents, an amazing saving of time on variety work.

## Other New Features

5% to 29% faster blade speed. Cuts faster, cleaner, smoother. Up to 44% more ripping capacity without extra attachments.
Power-packed 3 V-belt drive. *Start-stop switch which accidental manipulation can turn only "OFF," never "ON." *Blade tilts left—the safest way for right-handed operators. *Steel, all-purpose insert serves saw blades, and dado heads as well, without constant interchange, and at no extra cost. *Ground cast-iron fence has all-new micro-control, easier foolproof adjustments.

**DEALERS IN MOST CITIES. IF NONE NEAR YOU CONSULT US.**

## BOICE-CRANE COMPANY

**931 Central Avenue** **Toledo 6, Ohio**

Please send complete details on the Master-Monotrol* and catalog on complete line of power tools.

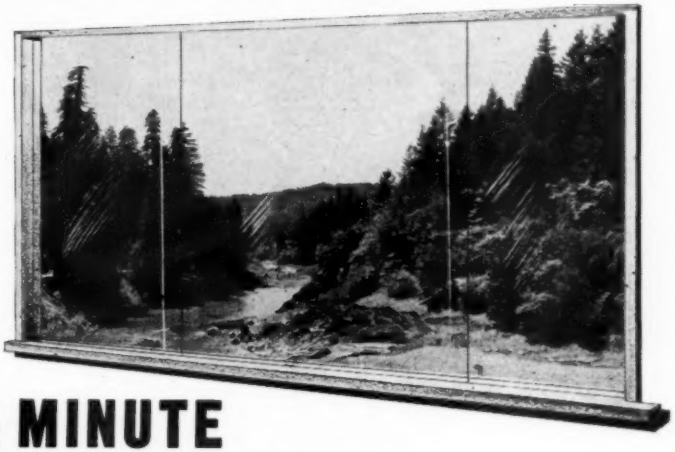
NAME .....

STREET .....

CITY..... STATE.....

*Tradename Reg.

# ARE YOU *LOSING* YOUR WINDOW MANUFACTURING BUSINESS?



# ½ MINUTE READING TIME.....

Franchise manufacturing rights for the Pierson Sashless Window are now being granted throughout the United States. Many woodworking plants have gained back the business they lost in recent years to the metal windows and other national lines by featuring this sashless window. These windows give you a modern horizontal slider to go with your double hung business.

The Pierson Sashless Window is just two pieces of 3/16 crystal glass sliding in a soft wood frame. The only hardware is the handle which is also the lock.

If interested please fill out the form for complete information.

**Ernest Pierson Company**
**4100 Broadway, Eureka, California**

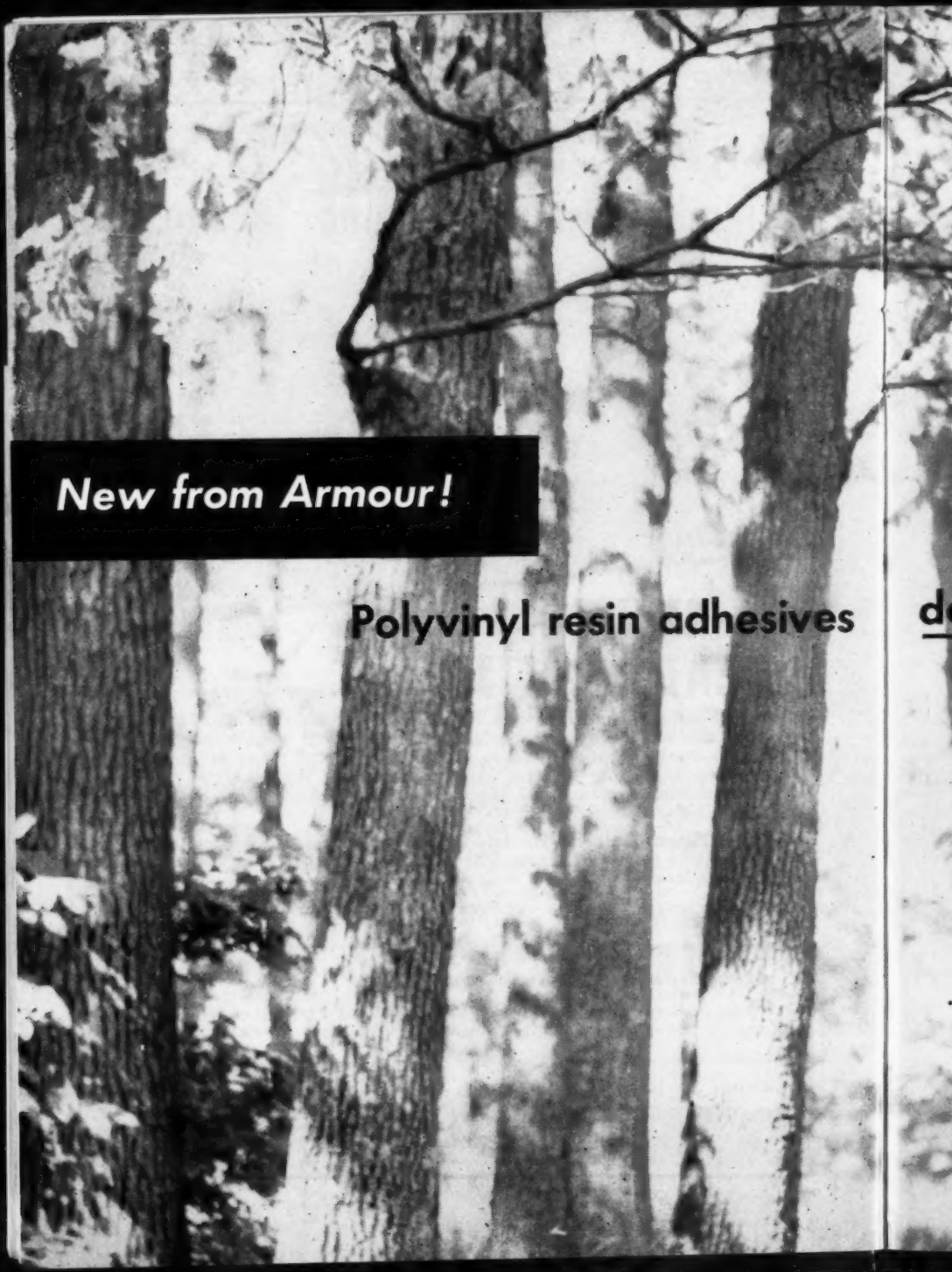
**Please mail me immediately your brochure telling the Story of Sashless Windows and how I can obtain the franchise for manufacturing rights in my area.**

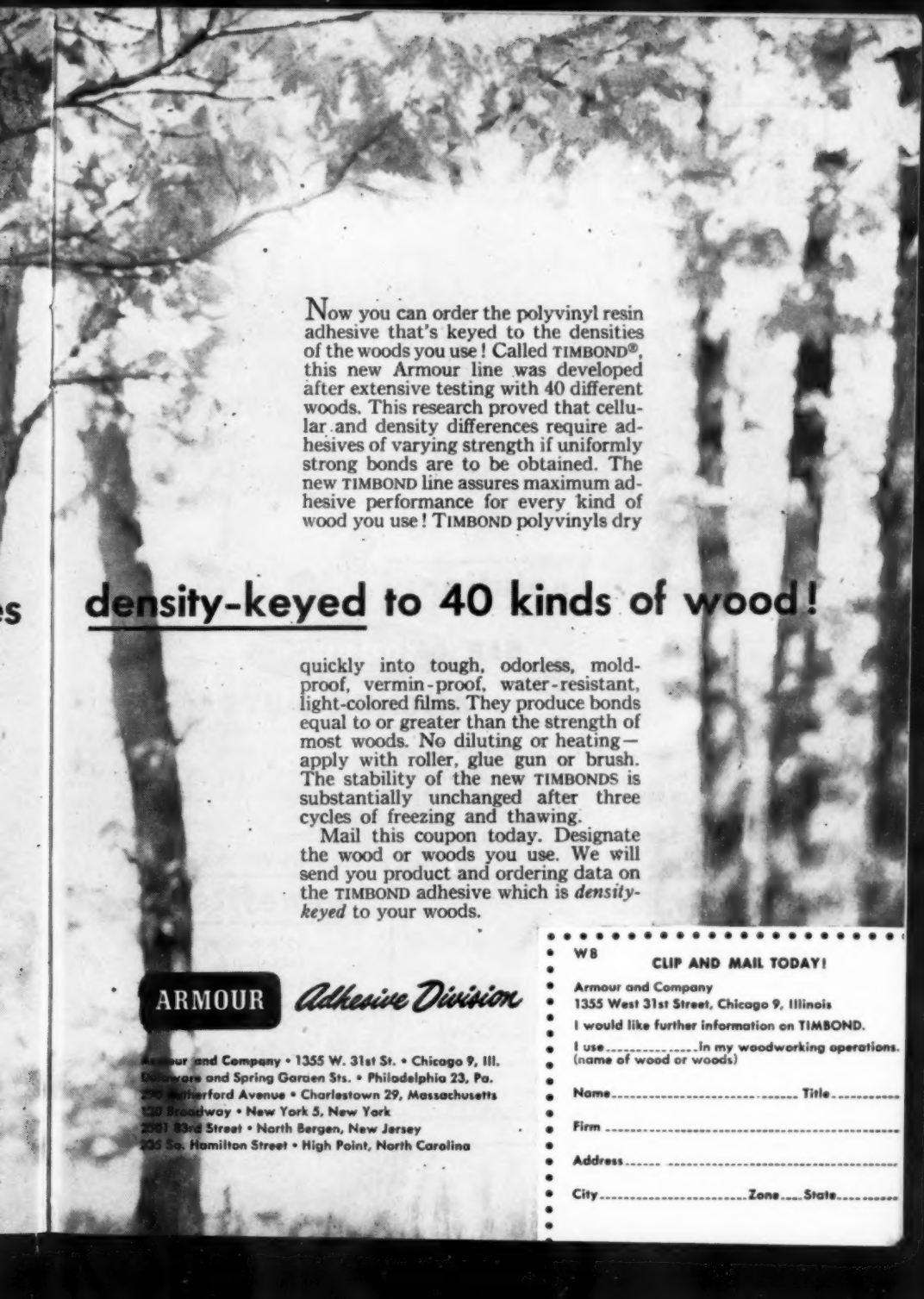
**Name**.....

**Firm**.....

**Mailing Address**.....

**City**.....**State**.....


New from Armour!
Polyvinyl resin adhesives



Now you can order the polyvinyl resin adhesive that's keyed to the densities of the woods you use! Called TIMBOND®, this new Armour line was developed after extensive testing with 40 different woods. This research proved that cellular and density differences require adhesives of varying strength if uniformly strong bonds are to be obtained. The new TIMBOND line assures maximum adhesive performance for every kind of wood you use! TIMBOND polyvinyls dry

# density-keyed to 40 kinds of wood!

quickly into tough, odorless, mold-proof, vermin-proof, water-resistant, light-colored films. They produce bonds equal to or greater than the strength of most woods. No diluting or heating—apply with roller, glue gun or brush. The stability of the new TIMBONDS is substantially unchanged after three cycles of freezing and thawing.

Mail this coupon today. Designate the wood or woods you use. We will send you product and ordering data on the TIMBOND adhesive which is *density-keyed* to your woods.

ARMOUR *Adhesive Division*

Armour and Company • 1355 W. 31st St. • Chicago 9, Ill.
Delaware and Spring Garden Sts. • Philadelphia 23, Pa.
200 Rutherford Avenue • Charlestown 29, Massachusetts
120 Broadway • New York 5, New York
2001 83rd Street • North Bergen, New Jersey
235 So. Hamilton Street • High Point, North Carolina

WB

**CLIP AND MAIL TODAY!**

Armour and Company
1355 West 31st Street, Chicago 9, Illinois

I would like further information on TIMBOND.

I use _____ in my woodworking operations.
(name of wood or woods)

Name _____ Title _____

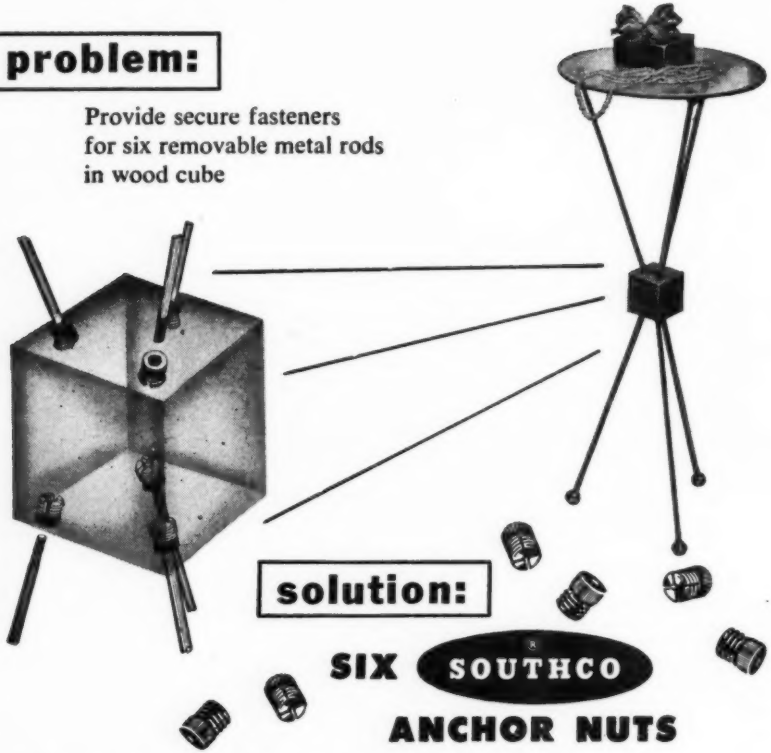
Firm _____

Address _____

City _____ Zone ____ State _____

## problem:

Provide secure fasteners
for six removable metal rods
in wood cube



## solution:

**SIX SOUTHCO ANCHOR NUTS**

Six 7/16" holes are drilled at proper angles, in cherry block. A Southco 1/4-20 Anchor Nut is inserted in each hole and expanded to form a rigid, permanent female thread in metal. Threaded end of rods are screwed into place by customer.


©1954

**SOUTHCO DIVISION**
SOUTH CHESTER CORPORATION
240 Industrial Highway, Lester, Pa.

Please send me complete catalog information on Southco Anchor Nuts

NAME _____

COMPANY _____

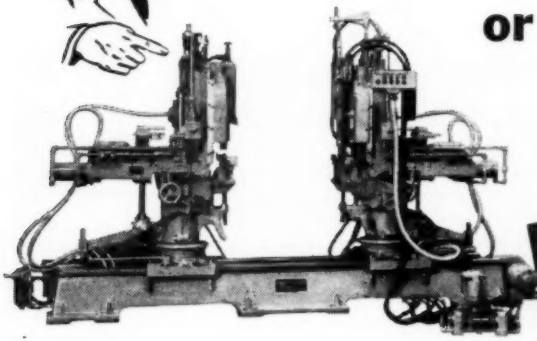
ADDRESS _____

_____


## benefits:

1) Assembly costs minimized
2) Size and cost of packing case reduced
3) Lower shipping costs
4) Less storage space
5) Quick and easy assembly by customer
6) Strong and rigid tripod

# Replace Two Units— Eliminate Two Handlings— or more . . . .



## with the Bell no. 24

That's standard procedure for manufacturers using the Bell No. 24—to make chairs, radio cabinets, parlor frames, tables and bedroom or other furniture. The Bell 24 is a money-maker, because it saws and bores, or saws and chucks **both ends at once** at the above speeds when fed two pieces at a time. Work is done accurately—assembly goes **faster** and spoilage is **minimized.**

### EASY TO OPERATE

Push button controls place all motors at the operator's fingertips. Any angle, up, down or sideways—is easily determined. Set-ups average 10 minutes or less.

### FLEXIBILITY

The Bell 24 can replace two and sometimes three units. Bits adjust readily to meet new requirements. Both ends can be used accurately at the same time to eliminate two handlings — one set-up. Immediate delivery.

*Write for Complete Details*

**Bell** **WOODWORKING MACHINES**

**THE BELL MACHINE COMPANY, 71 Jackson Drive, Oshkosh, Wisconsin**

# Diehl Cutterheads

## L-O-N-G on quality!

Don't you buy cutterheads for just one reason —to make all the money you can from your investment? Diehl Cutterheads are l-o-n-g on quality . . . made of the best obtainable steels, correctly heat treated, accurately ground to the closest limits. Each Diehl Cutterhead is backed by Diehl's 46 years of experience and by engineering facilities unsurpassed in the woodworking equipment industry. See your Exclusive Diehl Representative soon for proof of the l-o-n-g quality—and l-o-n-g-e-r profits—you get with Diehl Cutterheads. Or write for Bulletin No. 452. **The G. M. DIEHL MACHINE WORKS, INC., Wabash, Indiana.**

***Standard of Comparison in the Woodworking Industry***

**CUTTER DIVISION**

**Diehl**

# The Editor's Page

ON a lazy summer day, there are a number of subjects that come to mind which would make worthwhile subjects for this page. Why not a few thoughts on several of them?

NEED HELP? One of the best sources for solving production problems may be your suppliers—the people from whom you buy your machines and materials. Next time you have a finishing or cutting problem, call in a couple of salesmen from representative companies. They'll come up with some answers for you.

NO RELIEF. The Tariff Commission, in a 5 to 0 decision in June, turned down the application of domestic hardwood plywood producers for relief from the growing volume of low-priced hardwood plywood imports. The domestic industry had asked for higher tariffs, saying that foreign competition was driving U. S. manufacturers out of business.

A detailed analysis of the Tariff Commission decision has been made by the Washington office of the Hardwood Plywood Institute. Meanwhile, the Senate added to a minor House-passed bill, an amendment which would increase the tariff on foreign hardboard by reclassifying it as a wood rather than a paper product. The effect is to raise the import duty on foreign hardboard to a maximum of 16⅔%. The present tariff is 7.25% per short ton, with a floor of 7½% and a ceiling of 15%.

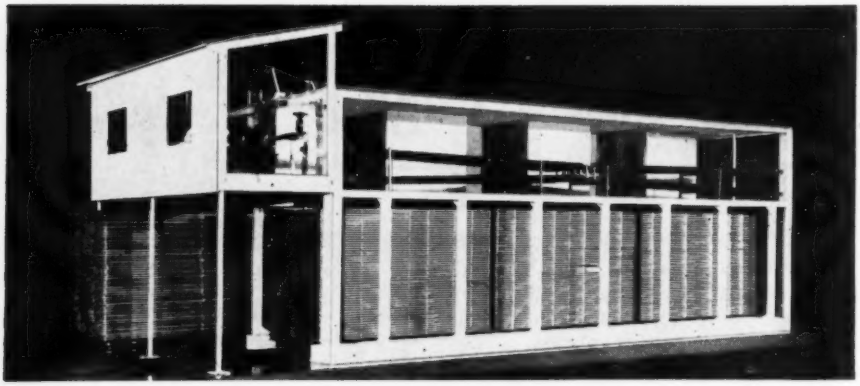
MORE CONVINCING. Recently a school board turned down an architect's plans for a school of wooden construction. Why?

1. It is not permanent . . . flimsy. (The oldest structure in the U. S. is the all-wood Derby house in Massachusetts.)
2. "Termites will get in it."
3. "It's a fire-trap and a hazard for our children." It was on one floor and each classroom had two exits.
4. "It will cost us in insurance." They were insured at a flat rate.
5. "It looks cheap."

These are myths in the public mind. As a result of this misconception in the public mind, 95% of school construction in 1955 will be of masonry construction!

The school building program is one of the potential wood markets which we cannot afford to ignore. We must constantly continue our program of public information and education. It is our opinion here at WOOD WORKING DIGEST that we are making progress in this direction. Entries submitted in the Award of Merit Contest prove it. However, we must continue the good work.

E. McDaniel
Editor



# Why We Believe In The Longitudinal-Shaft Kiln—

Moore Engineers developed and have been granted patents on both the longitudinal-shaft kiln and the cross-shaft kiln. Experience has proved the longitudinal-shaft kiln superior, having these undeniably greater advantages:

★ Faster, more uniform circulation through each sticker course (it's the air across the lumber that does the drying)

★ More cubic feet of air per H.P. is produced by the large multi-blade Moore Fans, turning at relatively slow speed

★ One motor and drive *outside* kiln operate *entire* fan system *(electric motors and wiring should not be subjected to kiln conditions)*

★ All fans turn at identical speed, delivering identical volume of circulation

**Over 70% of all the kiln-dried lumber produced in this country is seasoned with Moore Cross-Circulation Kilns—Let this record be your guide.**

**MOORE DRY KILN COMPANY**

Oldest and Largest Manufacturers of Dry Kilns and Veneer Dryers

JACKSONVILLE FLORIDA | BRAMPTON, ONT. CANADA | VANCOUVER, B. C. CANADA | NORTH PORTLAND OREGON

# Comments from THE NATION'S CAPITAL

**By Arnold Kruckman**
**Washington Correspondent**

New construction, in 1955, is expected to reach $42 billion, almost 12% above last year's record of $37 billion, according to revised outlook estimates prepared jointly by the Business and Defense Services Administration of the Department of Commerce and the Labor Department.

These figures are given to us by the Building Materials and Construction Division of the BDSA which is headed by Charles P. Redick as Director and Edward C. Gaertner, Deputy Director. The figures used, and which will be used in this report, are prepared under the direction of the Construction Statistics and Economic Branch of the Division, of which Walter W. Schneider is Chief. We are led to use the information because Mr. Schneider emphasizes the fact that the figures apply to an enormous volume of products of lumber and of the woodworking industry, which will be used, and which are being used, and should be included in the 1955 estimates.

Of course, these figures do not include the huge expenditure for products that will be used to furnish homes, stores, plants, and the other structures that will be built. We are told that in the construction program alone private expenditures will unquestionably increase by 14%—over 1955—to a total exceeding $29,500,000,000. These revised estimates, issued early in July, are considered one of the best indications reflecting the unprecedented volume of construction activity this year, far above the levels of earlier expectations. All agencies responsible for the data, emphasize that there will be virtually no abatement in the present rate of increase during the remainder of 1955. Several fiscal agencies of the Government have come out with the statement that the current tempo of business is the best in the history of the nation. At the same time, it

is only fair to report that some of the outstanding private agencies, which often supply the barometer for business prospects, suggest that the tensions and the existing conditions can easily lead to catastrophies. In other words, they agree that business is turning over at an unprecedented rate, but that there are inherent uncertainties which make it wise to understand that anything can happen in the realm of economics and industry.

The latest report gives the Department of Defense a payroll with three-fourths of the entire Government expenditure for wages and salaries by the Federal Government. It is reported unofficially that it carries one civilian for every man in uniform on its payroll. It consumes one-seventh of the national income and employs five million persons including its civilian personnel.

It is reported there are 1,070 activities conducted by the Government—almost solely by the Department of Defense—which may be properly classified as belonging in the civilian field. The recent Armed Services appropriation provided by Congress included items totalling $7,573,980,000 to be spent by the Army; $9,180,157,000 by the Navy; and $14,783,678,000 by the Air Force. These funds include some of the money that is provided to operate the 5,000 different kinds of businesses that Congress thinks should be solely under the control of private individuals.

Congressman Wint Smith of Kansas, who was one of the two notable commanding officers with Patton's Tank Corps in the Second World War, points out these interesting facts enumerated in the Hoover Commission Report: The Department of Defense operates 297 commercial planes, which in 1954 carried 3,900,000 passengers. Operation cost $204,400,000. This transport paralleled the routes of the established airlines. In 1954 the Military Sea Transport Service operated 221 ships carrying 2,038,381 passengers and 23,000,000 tons of cargo. Operation cost $549,000,000 plus interest on investment and taxes which were not included. Department of Defense owns 48 shipyards; operates 438 commissary stores, with total sales in 1954 of $306,000,000; 199 of these stores are in the United States, 239 abroad. It took 7,411 persons in the United States to operate these stores, two-thirds of whom were civilians. Outside the United States there were employed 5,450 of whom 1,758 were military personnel.

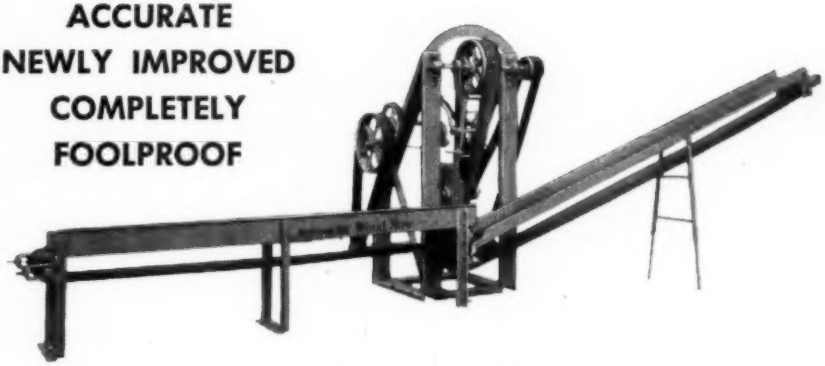
In addition to the commissary stores, the Department of Defense operates 4,150 post exchanges in the United States with sales of more than $470,000,000. In 1954 the payroll for these exchanges was $48,000,000 for 19,700 civilian employees. There are 2,700 post exchanges abroad with sales of $540,000,000. The foreign civilian payroll was $39,000,000 for 49,935 employees. Uncle Sam is the biggest storekeeper in the world.

Despite strenuous opposition by the Department of Defense and other Federal agencies an effort is now under way to secure a complete detailed listing of all other civilian enterprises conducted by the Federal Government, which could not be covered in detail by the Hoover Report.

# Save 75% Labor Cost

with the

**ACCURATE**
**NEWLY IMPROVED**
**COMPLETELY**
**FOOLPROOF**



## AUTOMATIC WOOD SAW

**IDEAL FOR AUTOMATIC WOODWORKING PRODUCTION**
continuous micrometer-type adjustment permits cuts from 3 to 24 inches with a precision of plus or minus ¼ inch to ½ inch depending on cut length.

**REDUCES LONG SLABS TO SHORT PIECES**
saves 75% labor in cutting wood for market.

**MANY HUNDREDS IN USE**

- In woodworking factories, some built into production lines, to cut precise lengths as small as 3 inches ± ¼" to as long as 24 inches ± ½". Cuts several stacked pieces simultaneously. Also used to dispose of long scrap lengths.
- At sawmills and lumber yards to reduce slabs to fire wood or for the hog. One man does the work of four, saves 75% in labor cost.

**$1160.00**

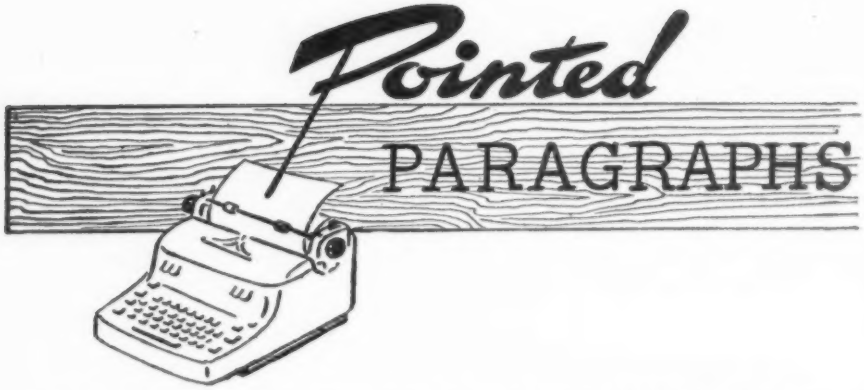
F. O. B.
SANFORD

## HOW IT WORKS

Wood up to 16 inches wide, 12 or more feet long and in any thickness, stacked up to 6 inches high, is loaded on feed conveyor. Work is automatically fed to 24 inch high-speed saw, timed to automatically cut the preset desired length. Length of cut can be altered during operation. Cut pieces travel along discharge conveyor, height adjustable on telescoping legs. Requires 10 h.p. electric motor or gas engine. Occupies 4 by 25 feet floor space. All metal construction, ball bearing equipped. Weighs 1700 lbs. Fully guaranteed.

## GENERAL FOUNDRY & MACHINE COMPANY

**Box 490 Sanford, North Carolina**




National Retail Lumber Dealers Association plans a 1955 Building Products Exposition to be held in the Cleveland Public Auditorium, Cleveland, Ohio, October 11-14. It will be held in conjunction with the annual Ohio Retail Lumber Dealers Convention.

*Write to Robert H. Greenbaum, Technical Training Section, Div. of International Education, Washington 25, D.C., if you are interested in permitting woodworking teachers from the Philippines to visit your plant. The office has been requested to assist in this way with a 10-month training program planned for these men.*

When you attend the Furniture Fair & Exhibit on August 28-September 1, in Chicago, take time to visit the Fine Hardwood Association, 666 N. Lake Shore Drive. Hand-carved leaves in the actual wood and natural color of each of the 39 species represented, add a striking note to the walls of the conference room.

*Uses of wood are numerous and varied. Man now utilizes forest products in over 10,00 different ways! As science discovers new uses for wood, the list continues to grow.*

A report is available from the Southeastern Forest Experiment Station, Asheville, N. C., concerning the source of lumber for furniture plants in North Carolina. It is most interesting and encouraging to see what is being done by North Carolina industries to preserve forest resources. We would like to see other states take similar action.

*Grand Rapids plans two furniture markets for the next six months: October 31—November 4 and January 5—January 18, 1956.*

Dollar totals of Dodge Reports of contract awards for future construction in the 37 states east of the Rockies set new high records again in June. The total was $2,255,209,000—up 30% over a year ago and the highest figure in Dodge's 64 years of construction news reporting.

# Save Time Save Money

use

## DUO-FAST automatic TACKERS

DUO-FAST AIR TACKERS cut production costs on case backs, drawer guides, and numerous other jobs.

MORE WORK, in less time, using fewer workers—that's the story on Duo-Fast Automatic Tackers and Staplers.

WIDELY USED in cabinet and woodwork shops, furniture plants, sash and millwork factories, toy makers, for a wide variety of fastening jobs.

A COMPLETE LINE of AIR TACKERS, HAMMER TACKERS, GUN TACKERS, STRIKE TACKERS, and AIR STAPLERS, including the model to save you time and money.

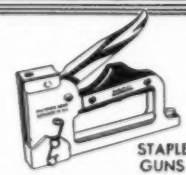
DUO-FAST GUARANTEE assures you of free service on Duo-Fast machines. An important money-saving feature.

DUO-FAST HAMMER TACKERS speed and simplify many tacking jobs. One-hand operation.

*50 Sales & Service Offices in Principal Cities*

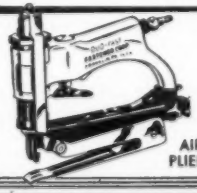
**WRITE TODAY FOR YOUR COPY OF THE DUO-FAST CATALOG & PROFITABLE SUGGESTIONS**

The *right* machine for each job is important. You'll find the *right* one in the **DUO-FAST LINE**



STAPLE GUNS

STRIKE TACKERS



AIR PLIERS

**FASTENER CORPORATION**

858 Fletcher Street • Chicago 14, Illinois

*The 1955 Chicago Summer Market topped all past markets in design, engineering and ingenious use of color, according to leading industry authorities. Sales were reported 30% ahead of last June and 17% over January business. Delivery schedules are reported jammed.*

The composition of radio and TV cabinets must be accurately defined if it is mentioned in advertising or other promotion materials, according to new trade practice rules passed by the Federal Trade Commission in June. The rulings are designed to protect the consumer from being deceived by imitation materials resembling genuine hardwoods.

*Forty different kinds of woods are used as paneling for the conference room in the botany building at the University of Texas.*

National Association of Manufacturers reports that the volume of new orders coming in from customers is probably the most important factor determining the rate of activity in manufacturing. Sales and new orders are now turning up. New orders dipped down after May, 1953 and did not begin the upward trend until the last quarter of 1954.

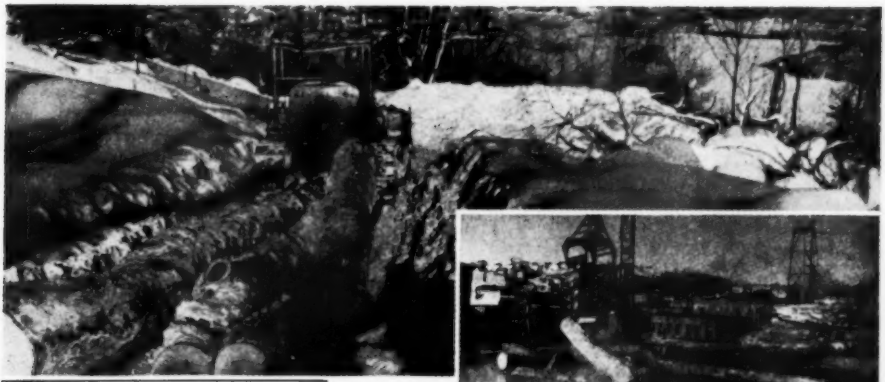
*Americans are building $700 million worth of churches this year for an all-time record in both dollar and physical volume. One-fourth of these are outright modern in design. Another fourth follow past styles and the remaining half represent churches preserving traditional effects in simplified contemporary forms.*

Spero Anargyros, an internationally famous sculptor, is producing visible evidence of the many and unique uses to which wood can be put. He is utilizing what is probably the world's largest single piece of laminated California redwood as a base for an unusual bas relief carving which will hang on a 4" thick redwood wall in the lobby of the new Pacific Mutual Life Insurance Co., San Francisco.

*Appearance grades for glued laminated structural members have recently been standardized and adopted as official recommendations by the American Institute of Timber Construction. Recognizing that various grades of appearance are desired for different uses, the AITC Standards Committee has developed three appearance grades having sufficient range to fulfill normal requirements for all types of use.*

National Hardwood Lumber Association has scheduled its 58th annual convention for October 11-13, Hotel Sherman, Chicago.

*Alfred A. Laun, Jr., president of the A. A. Laun Furniture Co., NHLA member in Keil, Wis., was named the "Furniture Industry Man-of-the-Year" at the June meeting of the Board of Governors of the American Furniture Mart. He is the 11th recipient of this annual honor conferred by the board on the manufacturer who has done the most for his industry and his community.*



**DEPENDABILITY**
**ASSURES *Your* PROFITS**
the wood you want, when you want it, in the quantities you want, through your Atlantic Man.

# *No Better Birch Anywhere*

We are proud of our production of Yellow Birch lumber. Its fine grain, natural lustre and soft satiny sheen establish it as "The Wood Beautiful".

Just gaze at these striking photographs. They will give you a graphic picture of what it takes to produce the finest Birch obtainable.

With many years production ahead at our sawmills it will pay you to become acquainted with our Yellow Birch. Once you try it you will come back for more.

Wherever you are, ask us for information and prices today. "No better Birch anywhere!"

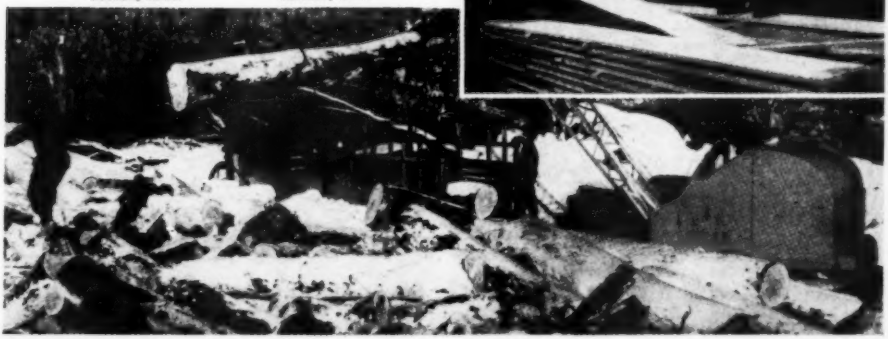
*Fifth in a Series*

*In the South contact our associates*–VESTAL LUMBER & MFG. CO., Box 1589, Knoxville 9, Tenn.

## THE ATLANTIC LUMBER CO.

88 BROAD STREET
BOSTON, MASS.

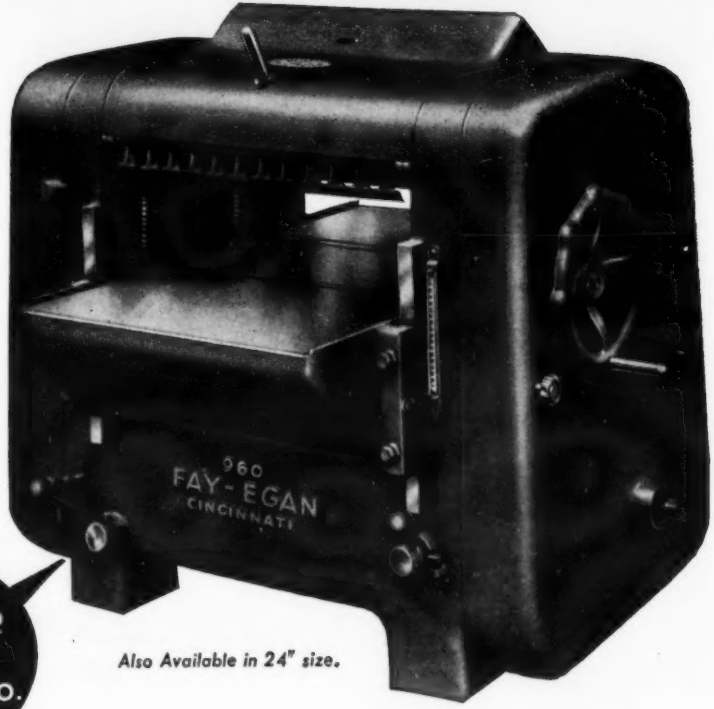
1055 SENECA STREET
BUFFALO, N. Y.



# NOW! get greater capacity at a lower price

## with FAY & EGAN'S NEW 32-inch 960 Single Surfacer

Production-proved, this Single Surfacer in 32" width is faster than old machines, saves on knife set-up and changeover time, too! A long list of features gives more production . . . better production . . . at lowest cost. Write for detailed literature today.




ONLY $2862.00 F.O.B. Cincinnati, O.

*Also Available in 24" size.*

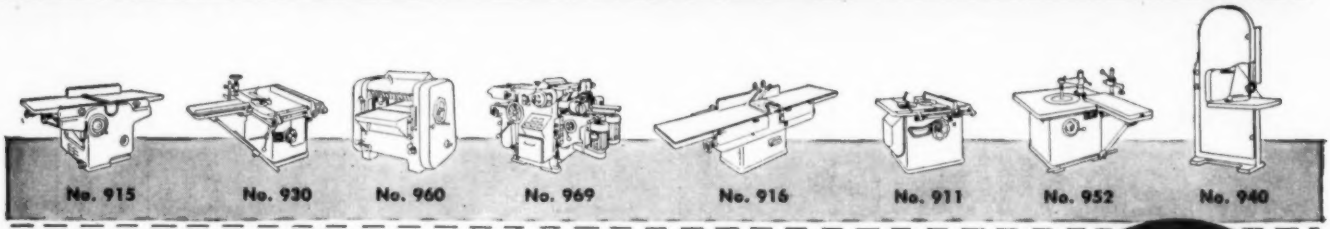
Check these ... • 4-knife, round, safety

Cincinnati, O.

## Check these outstanding features against any other machine

- 4-knife round safety cylinder turns at 5000 rpm.
- Special quick-setting knife gauge.
- Feedworks driven direct from cylinder.
- Surfacing thickness 8", depth of cut ½".
- Feed speed can be changed without stopping machine.
- Hinged aluminum hood permits quick, easy adjustment.
- Fan-cooled, totally-enclosed ball bearing motor, v-Belt drive.
- Sectional roll and chip breaker optional.
- New safety kick-back fingers for high production gang runs.

*Ask about our tool lease and deferred payment plans.*




**FAY & EGAN, 2023 Eastern Avenue, Cincinnati 2, Ohio**

NAME_____

TITLE_____

FIRM_____

ADDRESS_____

CITY_____ ZONE_____

STATE_____

- ☐ No. 911 Tilt Arbor Variety Saw
- ☐ No. 915 Combination Surfacer, Jointer and Moulder
- ☐ No. 916 Hand Planer, Jointer and Moulder
- ☐ No. 930 Tilting Table Variety Saw
- ☐ No. 940 24" Band Saw
- ☐ No. 952 Single Spindle Shaper
- ☐ No. 960 Single Surfacer, 24" and 32"
- ☐ No. 969 Four-Side Planer, Matcher and Moulder

**Ask about our tool lease and deferred payment plans**

# LETTERS To The Editor

**"We are trying to locate an article on the use of hardened sheet metal screws, in preference to wood screws, in furniture construction. We are interested in a comparative study."**

**H. N. C., Rhode Island**

"We would appreciate your putting us in touch with manufacturers of wrought iron, brass and wood legs, which can be used in the manufacture of occasional tables."

P. P. F., Colorado

**"I was very pleased to read the article about the NHLA inspection school in your May issue. I received my certificate there in July, 1951. I am in the toy and game business. WOOD WORKING DIGEST carries a lot of helpful information."**

**W. O. B., Ohio**

"One of our customers is asking for an Andrus Rotary Saw Filer. We do not recognize this name. Can you give us the name and address of the manufacturer?"

L. M. H., Minnesota

**"We have a problem in filling and patching. We want a filling material which we have seen and know it is applied under heat with a dispenser or applicator."**

**B. B., Missouri**

"We have substantial quantities of scrap hardwoods and veneers. Is there a market for this material, rather than our destroying it as is our current problem? We should appreciate your giving us any information."

H. R. G., New York

**"Where can we get hardware for sewing machine cabinets? Can you help us? Enclosed is a subscription form and check for two years of WOOD WORKING DIGEST."**

**O. S. N., Idaho**

"We can supply partially finished wood components for use in furniture manufacturing. "We have a very complete and modern wood working plant and would appreciate any information that you can pass along to us."

F. E. M., Michigan

**"We are trying to contact someone who might be interested in having us manufacture some small wood item for them where light machinery could be used and particularly where female help would be usable, since there is a large amount of that help in that area. We could do some assembling or manufacturing of small wood parts."**

**J. E., New York**

"We wish to secure handbooks on grading rules of veneer and plywood, also a technical handbook on veneers as to correct method of laying up and matching veneers, etc.
"Also, please advise if you have grading books on lumber."

R. L. P., Pennsylvania

**"We are interested in hearing from firms in the Chicago area who can supply a small molded wood item in quantity lots."**

**O. L., Chicago**

"It was a pleasure to examine news and text (WOOD WORKING DIGEST), which was, of course, of great interest, for we learned some new addresses. Is there among your readers someone who may be interested in our lines, give him our address. (Saw blade manufacturer.)"

R. F., Germany

**"We recently had a visit from a representative of the Forest Products Marketing Specialist of the Alabama Polytechnic Institute who suggested that we write you in regard to locating a used machine for making chips from hardwoods."**

**C. C. W., Alabama**

"We should like to contact manufacturers of machinery used for making round or square pegs ⅛" x 3½" or larger."

M. D. P., Mexico

**If you are interested in contacting any of these readers, please write the editor.**

# You may have spent enough to pay for an AMF De Walt machine... but

# DO YOU OWN ONE?

New Model GW-I 10" Saw with FULL 1½ H.P. Motor . . . complete for only $395 DELIVERED (custom-built 1½ H.P. motor, 10" saw blade, 4 detachable steel legs included)

Even if you've invested as little as $239 in shop equipment you may not be enjoying the profit-making benefits of a DeWalt®. We invite you to compare your present equipment and shop methods with these AMF De Walt features and operating advantages:

- One low-cost machine that does ALL the work of a swing saw, straight line cut-off and miter saw, table-type rip saw, dado machine, shaper plus many others.
- Savings of up to 60% or more in capital equipment investment alone.
- 75% savings in floor space alone! AMF DeWalt can be placed against any shop wall—instead of in the center of the shop.

Find out about ALL of AMF De Walt's many advantages—send today for free new idea book for industry. MAIL COUPON TODAY!

**LOOK AT THESE OTHER AMF DEWALT ADVANTAGES!**

- Top-side Cutting for Safest Cutting
- 90% Savings in Layout and Marking Time
- Reduces Waste—Salvages More Lumber
- One-minute Change-over, No Shut-down Worries
- Reduced Fatigue, Greatest Operating Ease and Safety
- Modern Straight-line Materials Handling

Another AMF Product

DE WALT POWER TOOLS

Lancaster, Penna.

SEND FOR *FREE* NEW IDEA BOOK ON INDUSTRY! 16 pages packed with illustrations. Shows you dozens of ways to cut costs on cutting jobs, time-motion study.

AMF DE WALT, Dept. WD-55-8, Lancaster, Pa.

Please send me your new idea book for industry.

NAME_____

ADDRESS_____

CITY_____ STATE_____

## Laminators

# Throw these away!

### make:

- plastic covered tops
- flush doors
- cold pressed veneers
- frame-to-hardboard layups

### eliminate:

- high labor costs
- handling hazardous, unwieldy metal
- overcrowding floor space
- unequal clamping pressure

*See the KWIK-KLAMP PROCESS in action.* At the National Association of Furniture Manufacturers Show. Booth No. 14-15, Conrad Hilton Hotel, Chicago. August 28-September 1.

- handling hazardous, unwieldy metal
- overcrowding floor space
- unequal clamping pressures
- bent beams causing poor pressure in the center
- clamp periods running 6 hours and longer
- human errors in clamping
- expensive initial investment

# modernize!

— with National's KWIK-KLAMP PROCESS.

Details are ready. A National field engineer has all the information you need.

RESYNS®

National ADHESIVES

**NATIONAL ADHESIVES.** Woodworking Department WD (Resin Division), 270 Madison Ave., New York 16. 3641 So. Washtenaw Ave., Chicago 32. 735 Battery St., San Francisco 11. 1511-23 So. Main St., High Point, N. C.

*OK show me!*

Send me one of your field engineers to explain the KWIK-KLAMP PROCESS.

Name_____

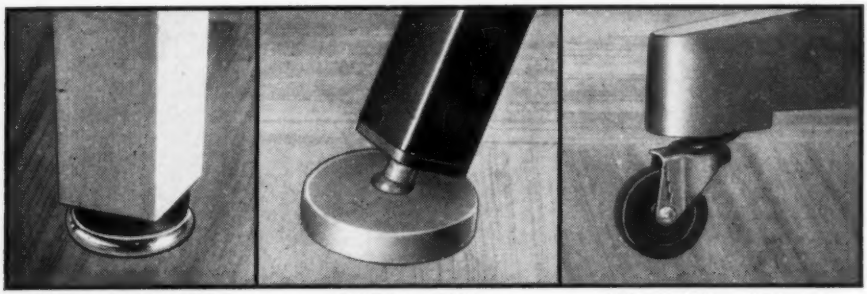
Title_____

Firm_____

Address_____

City_____ Zone____ State_____

# Perfect fit for any foot



Rubber-Cushion Glide | Full-Tilting Glide | "Diamond-Arrow" Caster

# Bassick glides and casters

Heavy or light, metal or wood furniture — there are Bassick glides and casters to fit them all!

And most important — they are designed to protect fine floors and floor coverings.

- **Rubber-Cushion Glides** slide silently on hardened steel bases that can't gouge.
- **Full-Tilting Glides** distribute the weight of modern spider legs over a wide area of contact.
- **"Diamond-Arrow" Casters** roll at a touch and swivel easily . . . make all types of furniture easy to move.

Look at your product again. Chances are Bassick casters and glides are the low-cost sales feature needed to put a "sold" ticket on your furniture. THE BASSICK COMPANY, Bridgeport 2, Conn. *In Canada:* Belleville, Ont.

Bassick
A DIVISION OF
STEWART SW WARNER

MAKING MORE KINDS OF CASTERS... MAKING CASTERS DO MORE

ADVERTISED IN The Saturday Evening POST

NAFM

# Fair In Chicago

THE first Supply, Equipment and Fabric Fair to be held by the National Association of Furniture Manufacturers will take place at the Conrad Hilton Hotel, Chicago, from August 28 through September 1. According to John M. Snow, executive secretary of the association, "This will be the largest gathering of furniture-making skill and experience ever gathered under one roof!"

The NAFM is combining its 27th annual business meeting with this well-planned exhibition and program.

Already more than 95 suppliers have signed for exhibit space. NAFM expects the show-time total to be 130, or a complete sell-out. There will be more than 150 technical experts present at the fair. About 4,000 furniture manufacturers, members and non-members of NAFM have been invited to attend.

**Expert Advice Available**

The staff of experts reads like a "Who's Who in the Woodworking Industry." There will be technical consultants from adhesive companies, dimension stock manufacturing operations, and plywood firms. Experts will also include men representing machinery manufacturers, furniture designers, humidifying equipment manufacturers, and many other suppliers. In fact, a visitor to the fair can see newest cost-cutting machines for the furniture industry, ranging from staplers and tackers to saws and larger equipment. There will be displays of moisture control equipment and spray painting. Nearly one million dollars' worth of top technical talent from every branch of the furniture supply industry will be available free for the asking during the NAFM Supply, Equipment and Fabric Fair.

John Snow sums up the worth of available technical advice by saying, "Nowhere else will furniture manufacturers be able to get the wealth of problem-solving answers and profit-

making advice as they will in one place at one time as at the fair. Were a furniture manufacturer to attempt to visit each of these experts in his own plant, it would take years and thousands of dollars to do it. Here he will be able to discuss virtually any problem in his business operation with leading advisors."

Some of the leading manufacturers in the furniture industry have heralded this fair as something no one can afford to miss. Paul Brandt, president of A. Brandt Co., Inc., has said,

"A competitive advantage can be gained in many ways: through the purchase of a machine, development of a new process, a cost cutting method, or attendance at a meeting where you gain new ideas. By combining their 27th Annual Convention with a Supply, Equipment and Fabric Fair, NAFM has put together a program that we are certain will give our executives many new profit-producing ideas to inaugurate in our business."

Joseph G. Griswold, Jr., president, Widdicomb Furniture Co., gave his views when he said, "there is a great need for a better understanding of production problems and a closer coordination between suppliers and the furniture industry. The NAFM fair will provide an excellent means for top level executives in both the manufacturing and supply fields to meet and discuss these problems."

President of Mersman Brothers Corp., Walter J. Mersman, continued in the same vein, "The keenest competition in the furniture industry is, in reality, a competition between managements and their ability to recognize and accept the latest sales and production methods. The really progressive executive who wants his company to keep pace, will find the NAFM Convention business sessions and the Supply Fair one of the best ways to find out what's new in the industry."

**Exhibitors**

The list presented here will have other additions before the fair. However, we did want to include in this report whatever information was available at press time.

**Adsco Molded Products Co.**
Newark 4, New Jersey
H. B. Katz, President

**Anderson Machine & Tool Works, Inc.**
Chaska, Minnesota
John D. Anderson

**Armstrong Machine Works**
Three Rivers, Michigan
T. H. Rea, Sales Manager

**Atlas Tack Corporation**
Fairhaven, Massachusetts
H. S. Callahan, Asst. Sales Mgr.

**Victor S. Barnes & Co.**
Grand Rapids, Michigan
Jack Peterson

**Bassick-Sack**
Winston-Salem, North Carolina
R. N. Westveer, General Mgr.

**Bechik Products, Inc.**
St. Paul 14, Minnesota
Robert B. Logan, Sales Mgr.

**Serge A. Birn Co.**
Louisville 2, Kentucky
Serge A. Birn, President

**Bissman Research & Designers, Inc.**
Springfield, Missouri
F. I. Hoflund, Vice-Pres. & Gen. Mgr.

**Black & Decker Mfg. Co.**
Towson 4, Maryland
R. A. McGrain, Sales Promotion Mgr.

**Blocksom & Co., Inc.**
Michigan City, Indiana
G. A. Montgomery

**The Borden Company**
Chemical Division
New York 17, New York
J. S. Brown, Mgr. Adv. Dept.

**F. Burkart Manufacturing Co.**
St. Louis 7, Missouri
Harry Meyer, Sales Dept.

**Wm. T. Burnett & Co.**
Baltimore 30, Maryland
J. Emory M. Carpenter, Sec'y.

**Burton-Dixie Corp.**
Chicago, Illinois
G. W. Gartz, Vice-President

**Chicago Curled Hair Company**
Chicago 8, Illinois
Cecil Barrington

**Chicago Furniture Forwarding Co.**
Chicago 22, Illinois
E. C. Snyder, Traffic Manager

**Clark Foam Products Co.**
Chicago, Illinois
W. L. Clark, President

**Columbian Rope Co.**
Auburn, New York
Lewis H. Swiller

**Columbus Coated Fabrics Corp.**
Columbus 16, Ohio
Alfred Shutt, Dir. of Adv. & Sales Pro.

**Curtis Machine Corporation**
Jamestown, New York
Herb Mattson, Sales Dept.

**The Dean Company**
Chicago 11, Illinois
Thomas A. Dean, Chairman

**Decar Plastic Corporation**
Middletown, Wisconsin
Geo. W. Johnson

**Deluxe Saw & Tool Co.**
Chicago 31, Illinois
Robert L. Ford, Sales Manager

**DeWalt, Inc.**
Lancaster, Pennsylvania
John Stolarz, Marketing Mgr.

**Henry Disston & Sons, Inc.**
Tacony, Philadelphia, Pennsylvania
John H. Dingee, Adv. Mgr.

**Eagle Ottawa Leather Co.**
Box 308
Grand Haven, Michigan
E. A. Meany, Jr., Sales Prom. Mgr.

**Farley & Loetscher Mfg. Co.**
Dubuque, Iowa
C. E. Walz, Ass't. Mgr.

**Fastener Corporation**
Chicago 14, Illinois
H. G. Aranda, Advertising Dept.

**Fiberesin Plastics Co.**
Oconomowoc, Wisconsin
Robert W. Healy and David McCalla

**Firestone Tire & Rubber Co.**
Akron, Ohio

**Flex-o-lators, Inc.**
Carthage, Missouri
Robert Redmond, Jr. Sales Mgr.

**Foster Brothers Mfg. Co.**
St. Louis 10, Missouri
H. T. Foster

**The Fox Edge Co.**
Lowell, Massachusetts
Frank E. Ely, Vice-President

**Fred Franke & Co.**
Louisville 6, Kentucky
L. P. Robards

**The Franklin Glue Co.**
Columbus 15, Ohio
John C. Sheward

**Gamble Brothers, Inc.**
Louisville 9, Kentucky
E. J. Tingle

**General Electric Co.**
Coshocton, Ohio
F. N. Kautzmann, Mgr.,
Advertising & Sales Promotion

**General Tire & Rubber Co.**
Textileather Division
Toledo 3, Ohio
Lee W. Mara, Adv. & Sales Prom. Mgr.

**Great Eastern Lumber Co.**
New York, New York
N. Nash

**Handy Button Machine Co.**
Chicago 8, Illinois
E. M. Zeisler

**Hardwood Dimension Mfrs. Assn., Inc.**
Nashville 3, Tennessee
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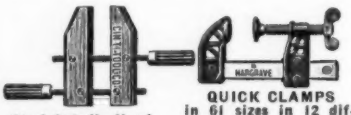

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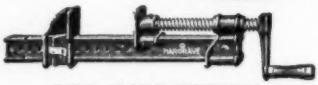

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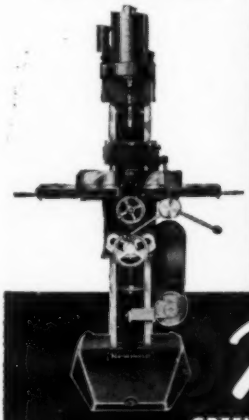

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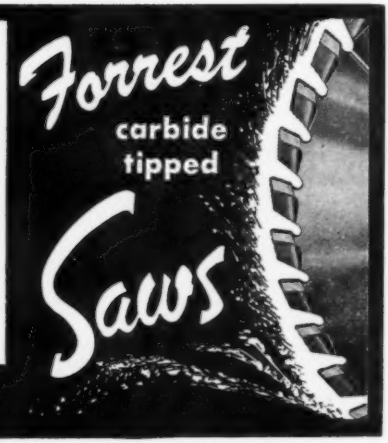

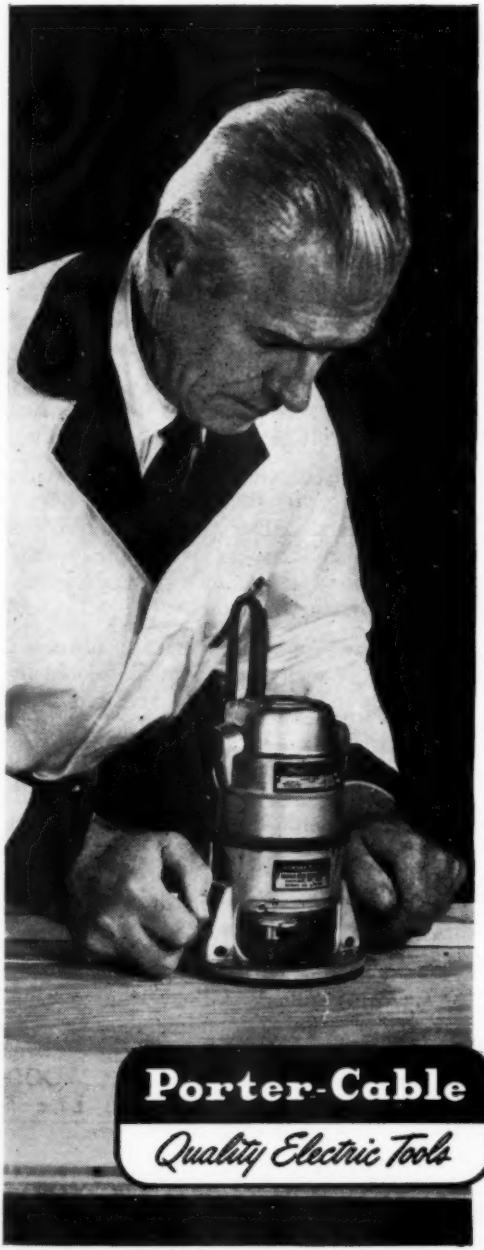


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### Program

We are including the detailed program in our story, but in addition, let us describe some of the highlights in detail.

Furniture manufacturers will get their first good look at what an atomic explosion does to furniture. A complete exhibit of the $20,000 worth of furniture tested in the May atomic tests will be on display. The "atomic furniture" exhibit will be open to all visiting the show. Primary purpose of including the furniture in the test was to give FCDA an indication of what hazards might be expected in an atomic blast, and what kind of decontamination measurers might be needed afterwards.

"Panorama of Promotion," a display of the furniture industry's tested retail sales aids will also be shown.

Nationally known sales training expert, Gary Gariepy, will be on the agenda. He puts his own principles to work as he tells how salesmen can be motivated and trained to reach higher sales goals. He has conducted sales training programs in 35 countries.

There will be two panels of experts discussing how men and machines can raise furniture production and profits.

Results of a 500-dealer survey made by the National Association of Furniture Manufacturers will be analyzed to tell manufacturers what the survey means in terms of bettering dealer-manufacturer relations.

Why people buy furniture, and what changes their thinking will be told by a leading psychological research man, Dr. Ernest Dichter.

The important matter of the AFL-CIO merger will also be discussed. C. P. Bersing, industrial relations director of the Norge-Division of Borg-Warner Corp., will tell what furniture manufacturers can expect from the coming merger.

There are many more interesting events planned for those who have the opportunity of attending the fair. The NAFM has done an excellent piece of work in planning the fair. WOOD WORKING DIGEST will have a number of staff members covering the event.

See you at the fair!

# PROGRAM

Theme: Increased Sales . . . Lower Costs . . . Greater Profits

**SUNDAY, AUGUST 28, 2:30 P. M.—6:00 P. M.**

Premier Showing of the NAFM Supply, Equipment & Fabric Fair—Exhibition Hall, Conrad Hilton Hotel, Lower Level.

**MONDAY, AUGUST 29, 9:00 A. M.—12:00 NOON**

**Arnold H. Johnson,** vice-president and director of research, J. Walter Thompson Co., New York. Address: "Changing Standards of Living That Point To Expanding Opportunity For The Furniture Industry."

**C. P. Bersing,** director of industrial relations, Norge Division, Borg-Warner Corporation, Chicago. Address: "What's Ahead On The Industrial Scene."

**C. D. Dosker,** president, Gamble Brothers, Louisville, Kentucky. Address: "Let's Take A New Look At Wood As A Raw Material."

**Luncheon:** 12:15 P. M. to 2:00 P. M.

**Robert Houlihan,** vice-president and treasurer, Moller's Inc., Cambridge, Massachusetts. Address: "How To Sell More Furniture."

**TUESDAY, AUGUST 30, 9:00 A. M.—12:00 NOON**

**Ray DuBrucq,** president Woodworking Machinery Manufacturers Association. Panel: "Increase Profits—Lower Costs with Modern Machinery."

Panel Members—J. H. Petter, President, Buss Machine Works, E. J. Bell, Jr., President, Bell Machine Co. Judd Mansfield, Chief Engineer, Greenlee Bros. Ed May, Chief Engineer, Whitney & Sons, A. B. Loft, Secretary-Treasurer, Yates American Machine Co. W. C. Hagstrom, Advertising Mgr., Madison Machine Works.

**Panel—**"Using Incentives To Speed Up Production, Improve Quality and Increase Profits."

Panel Members: Serge A. Birn, president, Serge A. Birn Co., Inc. George J. McNew, vice-president in charge of all manufacturing, A. Brandt Co., Inc., Ft. Worth, Tex. John W. Mock, associate of Business Research Corp. and Byrne Industrial Services, Chicago. Irl E. Ward, vice-president, International Furniture Co. E. A. Simpson, plant mgr., John Widdicomb Furniture Co.

**Luncheon:** 12:15 P. M.—2:00 P. M.

Address: "Washington Is Your Business."

**NAFM Annual Banquet—**6:30 P. M.—10:00 P. M.

Speaker—**Dr. Kenneth McFarland,** Consultant, General Motors Corporation Address: "U In Business."

**WEDNESDAY, AUGUST 31, 9:00 A. M.—12:00 NOON**

**John D. Corrigan,** managing director, Executive Institute, New York, N.Y. Address: "How To Build Profit In Your Sales Dollars."

**Arthur A. Hood,** vice-president, Vance Publishing Co., Chicago. Address: "Analyzing The Furniture Industry's Distribution Weaknesses."

**Armand Gariepy,** president, Sales Training International, Barre, Mass. Address: "How To Get Manufacturers Agents To Sell More For You."

**Luncheon:** 12:15 P. M.—2:00 P. M.

**DeLoss Walker,** America's Ambassador of Action. Address: "Progress Thru Adjustments."

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Now, available, is the new No. 6 POWER Electric Tenoner . . . the result of more than 80 years of service to the woodworking industry. Accurate workmanship, heavy construction and a host of features including simplified controls, motors which can be raised or lowered, separate adjustment, etc. Let us tell you more about the No. 6 . . . write today.

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*Manufacturers of POWER Machinery Since 1867*

# Fundamentals of WOOD MACHINING

By Carl Chekouras

ONE of the most interesting operations of wood machining is that of shaping. Nearly all furniture has to have a shaping operation along the lines somewhere, Figure 1. Although the shaper is frequently used for molding, tenoning, and various other cuts, the actual shaping for which the machine was designed, is cutting oval tables, fancy chair backs, paint brush handles, and many novelty wood items, Figure 2. A shaper then can be identified simply by its name—a machine for cutting odd shapes. Although shaping is occasionally accomplished by a router, it is still the same basic principle as all shaping operations.

Because of the various grains to be cut, it is essential that the shaping spindles run at high rates from 7200 r.p.m. to over 15,000 r.p.m. Later we will discuss in detail the various shaping machines and the many shaping cuts.

## STICKING

It is controversial as to where the term "sticking" originated. The operation known as sticking is that of machining a pattern on one edge of a stick of wood. A few years ago sticking was

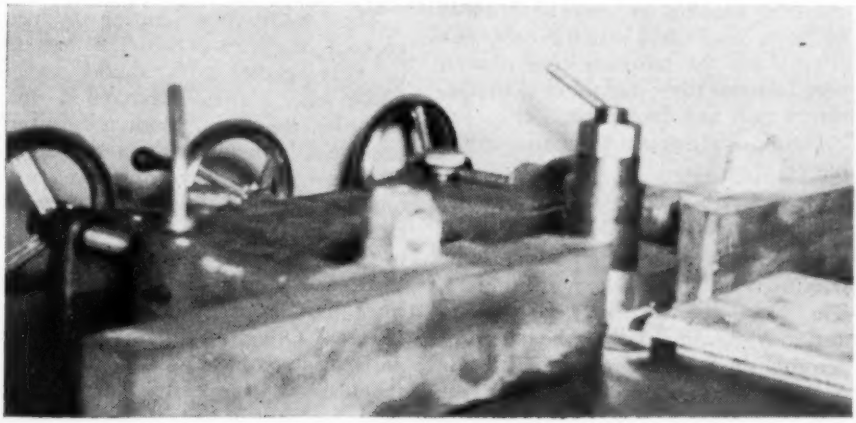

*Figure 1. Cutting lip cupboard door edges on shaper.*

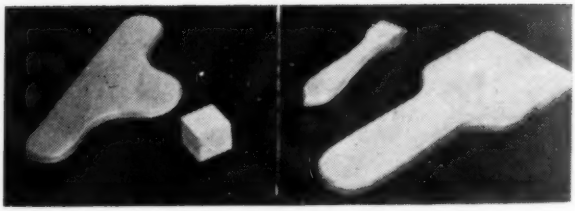

*Figure 2. Various wood parts made by shaping.*

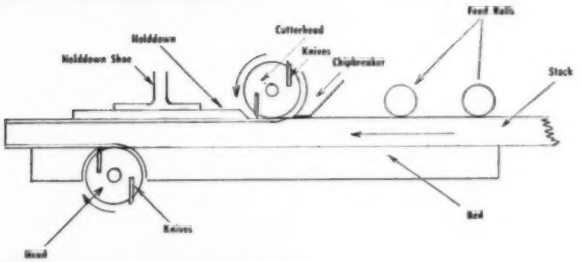


*Figure 3. Principle of two-head sticker.*

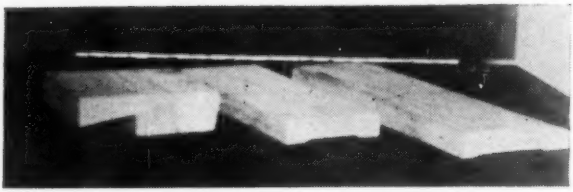

*Figure 4. Typical interior moldings.*

accomplished on a machine for such work and was called, simply a sticker. The modern molders are more adaptable for sticking as they have more purposes than machining only one edge. Now the term sticking is used very infrequently—mainly in manufacturing sash and door parts.

Figure 3 illustrates the basic principle of a sticker.

## MOLDING

The purpose of molding is that of producing lineal contours such as the trim used in building homes, Figure 4. There is a difference between sticking and molding. In molding, the pattern is accomplished by the co-ordinated use of more than one cutterhead on the same machine. Basically speaking, the modern molder receives a dimension piece of stock and produces the finished molding.

## JOINTING

The cut known as jointing produces an edge on pieces of material that can be put together with almost an invisible joint. Material is jointed in order to widen the stock. Modern furniture could not be made without the use of jointing—joining two or more parts together to make up such parts as table tops, Figure 5. Although jointing can be done on many machines, there are certain applications which must have a particular type of joint, Figure 6. Oftentimes a joint has mating parts. Some have "V" grooves or tongue and groove that increase the holding power of the glue and produce a better joint for finished work. New

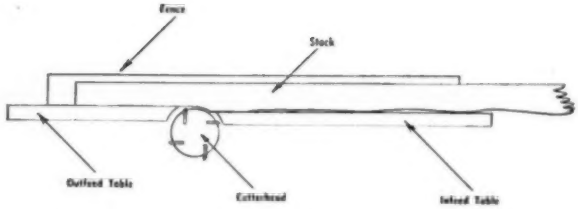


*Figure 5. How a jointer is used to cut straight edges.*

furniture, being produced without lamination must have better glue joints.

The jointer is usually furnished with a tilting fence, permitting the machine to be used for cutting bevels. Beveling on a jointer has many uses in producing furniture, patterns and other work.

## FACING

To produce any wood product it is always necessary to have the material faced. Facing the wood has to be very definite, as the final beauty of wood graining, etc. is brought out by the quality of the facing operation. Although facing can be done on a planer, the type of planer used for facing the material differs from the one used for planing. In the latter case, the stock is rough planed to a basic dimension then face planed.

In the production of sash and door parts, the molder is used to do the facing work. This is an important function as the assembly of the product depends on the relationship of the pattern to the face of the stock. For instance, the typical sash is manufactured so that the faced side is usually the interior side of the window and must be smooth and accurate, Figure 8.

In manufacturing furniture, there are two different processes for facing. In one the stock is held to a jointer and that surface made flat, regardless of any warp or twist. From there the stock is conveyed to a surfacer which machines the opposite side producing a given parallel to the face side, Figure 9. A machine manufactured for surfacing has definite characteristics that, although it can be used for planing, is primarily for surfacing stock.

## END JOINTING

In the manufacture of furniture and case goods, it is necessary to joint the ends of the stock so that the product will be durable as well as pleasing in appearance.

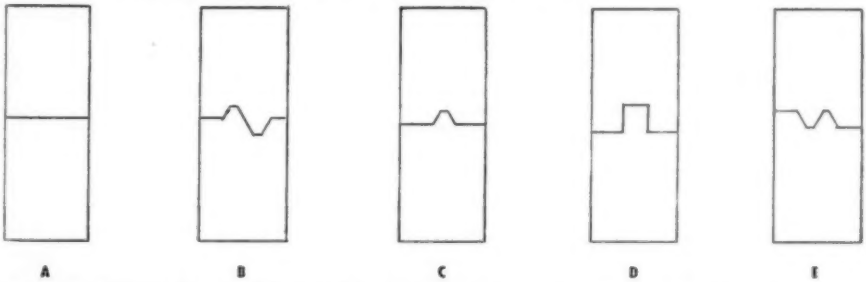


*Figure 6. Types of glue joints; A—Straight edge joint; B—reversible double tongue and groove; C—"V" tongue and groove; D—regular tongue and groove; E—reversible single tongue and groove.*

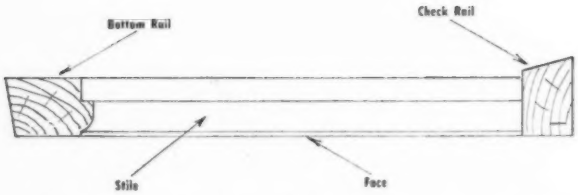


*Figure 7. Bottom section of double hung sash showing assembly from "face" side.*

There are many types of end joints used: butt joint, drawer joint, dovetail joint, and lock joint, Figure 9. The lock joint is very commonly used in the manufacture of cedar chests, Figure 10. In framing, the lap joint is very popular and practical because it can be made on many machines including the ordinary saw. There are many types of end joints as shown in Figure 11, but each is only adaptable to certain jobs.

One of the recently popularized types of end jointing is that of finger jointing, Figure 12. The use of finger jointing was primarily for conservation of material, but it has found its place in many more applications. Most finger jointing can be done on a tenoner or a shaper. It is still more practical to do on a finger jointing machine. Later we will discuss the applications of finger jointing in detail.

## END MATCHING

In order to be sure that flooring will lay flat, it is usually end matched. This process, accomplished on a machine designed for this work, consists of cutting a tongue across the end grain in one end of the stock and a groove across the end grain in the other end of the stock. This same type of joint is used in drop siding and in some paneling, Figure 13.

## BORING

One of the apparently simple woodworking operations is that of boring or drilling. Although it is simple in appearance, the science of wood boring has many problems. It is considered one of the woodworker's toughest problems. Because of the many types of bored holes and their difference in uses, it is impossible to use one type of boring bit for all operations. The basic or primary wood boring bit is such type as used by the carpenter and has such standard characteristics as a screw point and two outlining spurs

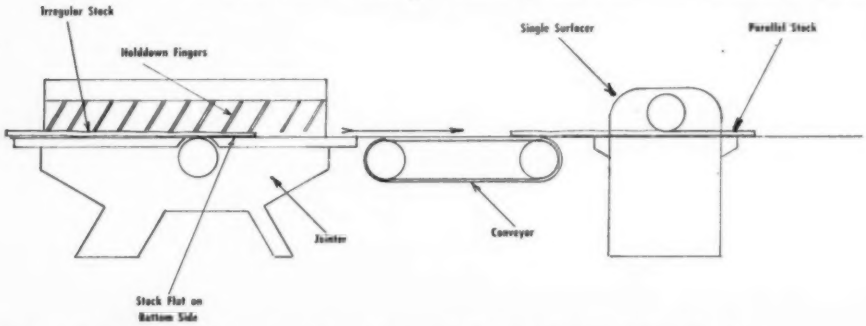


*Figure 8. Using jointer with feeder and conveyor to straight plane irregular stock.*

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MORE SILENT THAN EVER BEFORE

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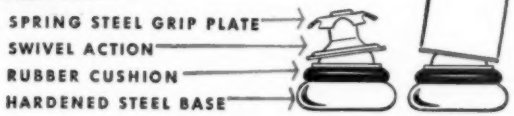


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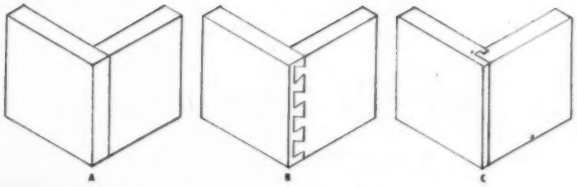


*Figure 9. Three types of corner joints: A—butt joint; B—dovetail joint; C —drawer joint.*

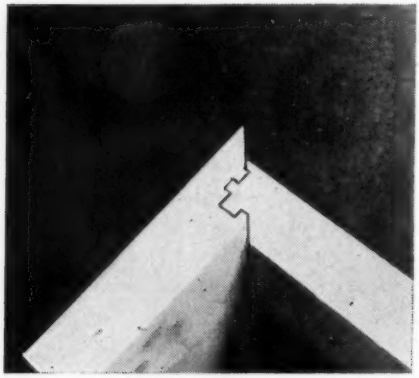

*Figure 10. Lock corner joint.*

plus a cutting lip to remove the stock.

Modern demand for more accurate cutting has created the necessity for boring bits to hold precise diameters. Such types of holes are required for dowel fitting. Most dowel drills are used in a machine designed for that work only. The illustration shows the characteristics of a hand powered drill bit, Figure 14. Although the same in function, machine or power drilling requires a different type of bit. Illustrated is a power drilling bit, Figure 15. Later we will further explain each boring operation.

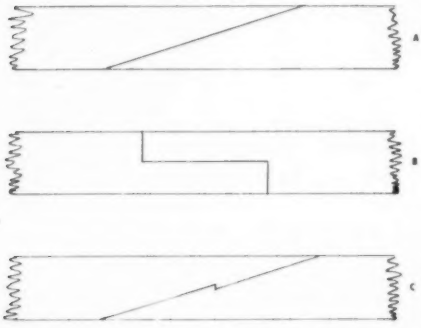


*Figure 11. End joints: A—scarf joint; B—lap joint; C—lock scarf joint.*

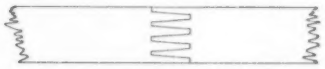

*Figure 12. A standard finger joint.*

Mortising is the operation that provides a slot for insertion of a tenon, producing what is known as a mortising and tenon joint. The basic operation is accomplished by a mortising machine fitted with a square mortising chisel having a special drill turning within it, Figure 16. Although such a machine can produce a hole other than square, a long rectangular cut should be made on a chain mortiser. One of the early types of ordinary mortising was the stab type mortiser. This is merely a foot operated machine that has a plain chisel so arranged to cut round holes into square.

The chain type mortiser has been adapted to many machines from an

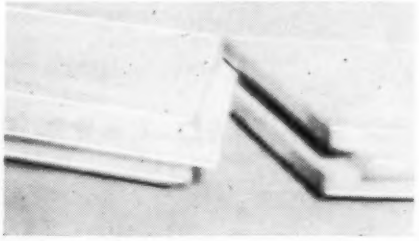

*Figure 13. End matching fir flooring.*

Figure 14. Screw point auger.

Figure 15. Spur point drill.

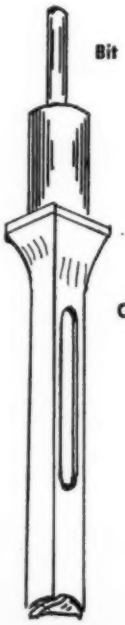


Figure 16. Mortise chisel and bit.

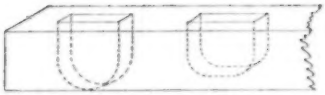

Figure 17. Chain mortiser cuts.

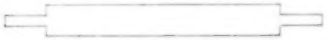

Figure 18. A piece of stock tenoned.

ordinary drill press to a special machine for automatic mortising sash and door parts. Figure 17 illustrates the type of mortising cuts that can be made by a chain mortising machine.

## TENONING

There are many ways of cutting a tenon, from ordinary saw cuts to the modern and efficient tenoning machines. Although alike in appearance and function, the operation of tenoning becomes very much unalike in the product being manufactured. Figure 18 shows a piece of stock tenoned on each end. In another chapter we shall discuss cutting tenons on the various machines.

**(To be continued.)**

## HARDWOOD BODY PLANNED FOR PACIFIC NORTHWEST

An organization of firms and individuals interested in the hardwoods of the Pacific Northwest is in the process of formation as the result of a recent meeting in Seattle, Wash. Interested parties at this meeting, representing Oregon, Washington and British Columbia, named a board of 12 directors which has the authority to formulate by-laws and nominate a slate of officers. The first action taken by the group, under the direction of L. R. Smith of L. R. Smith Hardwood Lumber Co., Longview, temporary chairman, was to propose standardized grading and inspection rules for northwest hardwood lumber and logs.

---

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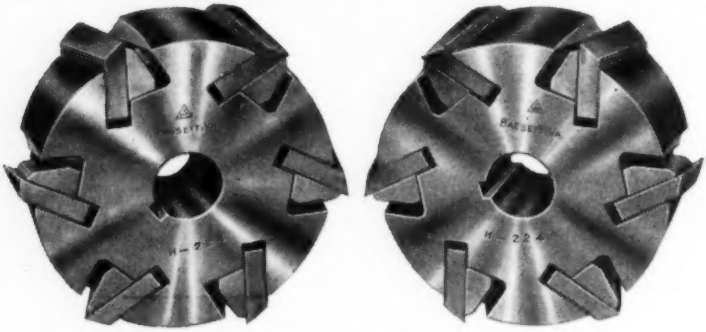

These new VMT Super Shear Cut Heads are built of tough special alloy steel with corrugated back knives tipped with Tungsten Carbide, making it possible to use entire knife and so easy to replace — a feature not found in most heads of this type!

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Here's real news if you want up to 50 per cent longer production runs (compared to High Speed Steel knives) with less sharpening. One wood furniture manufacturer reported production runs of 60 and 90 days.

Heads are available in 6-1/4" cutting circle x 2-1/4" wide and can be made to any specifications required. Check with us right away and step up your production — lower your costs— with the new VMT Super Shear Cut Head with Replaceable Carbide-Tipped Knives!

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# Profitable Production of LUMBER CORES

by H. H. CONNELLY

HOW many times do you handle a board before it ends up in a finished lumber core? Remember, handling adds nothing and takes nothing away. It's like freezing a skunk to get rid of the smell—a necessary evil that must be tolerated to get a job done.

Examine your operation and add up the number of times a pair of hands are laid on a board from the beginning to end. This multiplied by hourly rate spells overhead that goes for material handling.

Cut out a portion of this and you will find a sizeable saving that you can add to the profit side of the ledger.

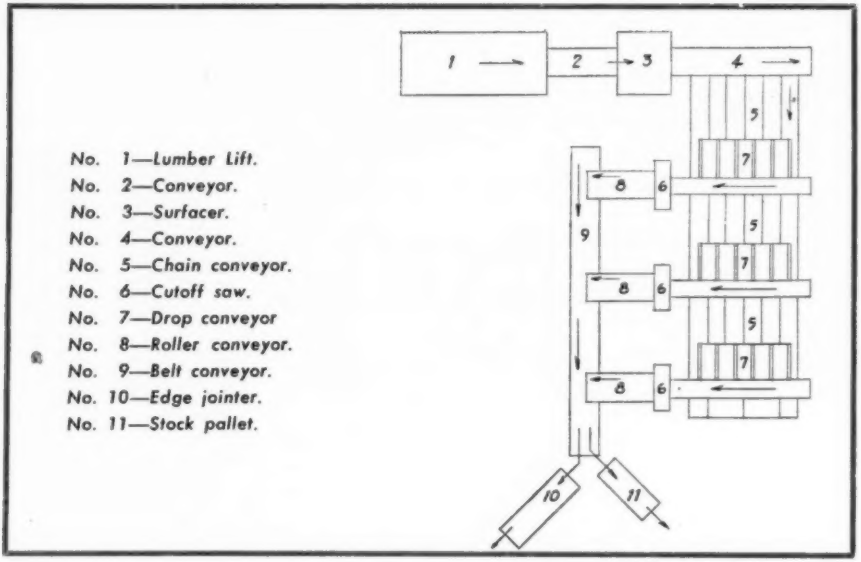
Before putting in a conveyorized operation, a furniture manufacturer discovered half of his crew at the swing saw consisted of labor that fell in the frozen skunk group. For one, the lumber was removed by one man and stacked on the rack for the swing saw operator. After cutting, another man stacked the pieces. Still a third fed this stock through the rough planer and a fourth tailed the planer. A fifth fed the stock to a jointer and a sixth removed and stacked on trucks for the straight line rip saws.

The final setup agreed upon eliminated one-half of the crew. The roughing planer was fed by the man who unloaded the kiln trucks. The lumber was conveyed to the swing saws and cut into stock length without being touched by human hands.

The number of men off-bearing for the swing saws was reduced by half with the installation of a long belt conveyor and placing the off-bearer at the end. Three saws fed their stock to the conveyor—meaning one man was able, with a conveyor, to do the work of the previous three.

By placing the lumber jointer at the end of this conveyor and adding a helper, the same man that tailed the conveyor belt fed the stock into the jointer instead of stacking on trucks.

It is well to remember in planning any material handling operation, the object is to determine how to transport materials in the shortest possible




time with the least expenditure of money and energy so as to obtain the maximum productive efficiency.

To check the efficiency of any lumber core operation you must have a measuring stick. In this case compare the production of lumber per thousand feet of man hours to the proposed layout. If the saving is not great enough to warrant the investment, another layout should be studied.

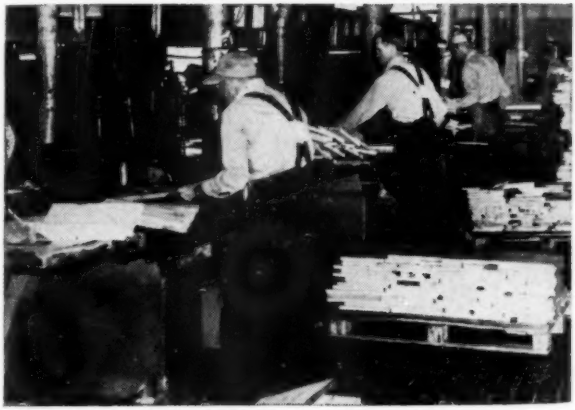
In most cases, studies have shown that the installation of mechanical material handling equipment will generally bring about a reduction in handling costs ranging from 20 to 90%.

You will find many variables when studying a rough lumber layout. The type used depends upon many factors—room, type of lumber, end product, etc.

Figure 1 is an excellent conveyorized layout for lumber core production. The lumber is brought into the mill and unloaded from the lumber lift. You will find without the lumber lift an extra man will be required when the load is stacked high. The use of the lumber lift, however, permits the load to drop to conveyor height, allowing one man to unload the lumber—raising the load as it is removed.

The short cut lengths are conveyed by Number 8 roller conveyor to belt conveyor Number 9. Here an operator removes the stock and either feeds the thin stock through a second planer for additional planing or feeds stock to jointer.

This operator drops the boards on the belt conveyor which carries the lumber to the planer. From the planer it is conveyed to the swing saws. The saw operator jacks his own lumber by an air operated drop conveyor (Number 7) which raises from the floor, deposits boards on the storage table and



*The straight line rip saw is capable of producing an excellent glue joint for core production. Here a battery of straight line rip saws are ripping out defective core stock for gluing.*

Courtesy G. M. Diehl Mfg. Company

returns below the main conveyor for other boards to pass on to the following saws.

With this lineup and modern equipment it is possible to process over 3,000 board feet of 4/4 lumber per hour.

Since the crew consists of seven men, the production per man hour is equal to 428 board feet per man hour.

## THE PURPOSE OF JOINTING

To joint or not to joint is the question most frequently asked when planning a lumber core layout.

Probably a more satisfying answer can be made by answering first—what grade of lumber are you using? And, are you using glue joint rip saws?

How will the grade of lumber effect this question?

First, suppose you are processing a grade of lumber above No. 2 Common. The lumber will contain a high percentage of cuts that will never need to feel the bite of a saw. Why rehandle the lumber then, if a suitable joint can be added to the swing saw group? Especially if your lineup is similar to the one shown. The man tailing the swing saws places the cuts into the jointer and only one additional man is required to remove from the jointer and stack for the next operation.

On the other hand, consider boards that contain a defect that must be ripped out. If first we can joint two edges, the rip saw can remove the defect without touching the outside edge, thereby saving two passes through the machine.

Unquestionably, if a profit is to be made from the production of lumber cores, the raw lumber must remain in the lower grade. Therefore, we will find more and more of the lower grade cuttings going through the jointer that must be re-ripped. You will find, after a careful check of jointed low grade stock, that wave, bark, knots, splits, etc., on the jointed edge are such that re-ripping to remove the defect, is a necessity.

Why spend the money in labor and equipment to joint if it must be redone at the glue joint rip saw?

After making a careful check of cuttings that would by-pass the ripsaw, one furniture manufacturer found that 12% was a high figure for the grade and species he was using.

Using this figure as a basis, multiply by 3,000 feet, the amount of rough lumber three saws could process in the given lineup. We find this equals 360 board feet. After reducing this by 10% for the swing saw waste, we would end up with 324 feet. This nearly equals the production of one rip saw for one hour. Since two men are required on the rip saw and only one additional man for jointing, a net saving of one man hour would be realized. Is this enough to pay for investing in a jointer?

## SELECT YOUR JOINTER WITH CARE

In the satisfactory manufacture of lumber cores for plywood, two things stand out. (1) The lumber must be correctly seasoned and (2) the joint must be right for gluing.

Much progress has been made on the problem of jointing wood. Today's methods are confined to two—the straight line rip saws equipped with a glue joint rip saw, and the lumber jointer.

To provide a good gluing surface, the wood must be smooth, square and straight. The machine you select to do the job must do all of these at an enormous rate and without rejects.

Here are some of the good features you should insist your jointer contain to perform the above job. First, it should have large bearings and be carefully dynamically balanced at high speeds. The frame should be heavy to eliminate all vibrations at high speeds. A machine equipped with a frequency changer to operate at 6,000 to 7,200 r.p.m. is best.

The machine should be chain fed and with a speed capable of carrying the stock across the cutters equal to the output of your swing saw groups.

One lumber jointer is supplied with a feed chain designed of heavy links forged from steel blocks 4″ wide by 1-5/16″ thick and weighing 3 lbs. and 14 oz. each. The chain is guided by an ingenious arrangement of multiple grooves in a renewable track. The back of each link has corresponding grooves for guiding the board across the cutter.

In selecting heads for your jointer, secure one with knives three or four inches long. By doing this you can move the head out, as it becomes dull in one spot, and eliminate frequent sharpening. A millwright can sharpen a 4″ knife as easily as a 2″ blade.

*"No, these ain't Bermuda shorts! Wife shrunk my overalls."*

---

"Why do you cry at the picture show," the husband asked, "over the imaginary woes of people you've never met?"

"For the same reason you jump and yell," she replied, "when a guy you don't even know, from a school you never went to, goes over for a touchdown."

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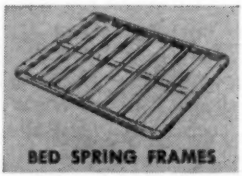


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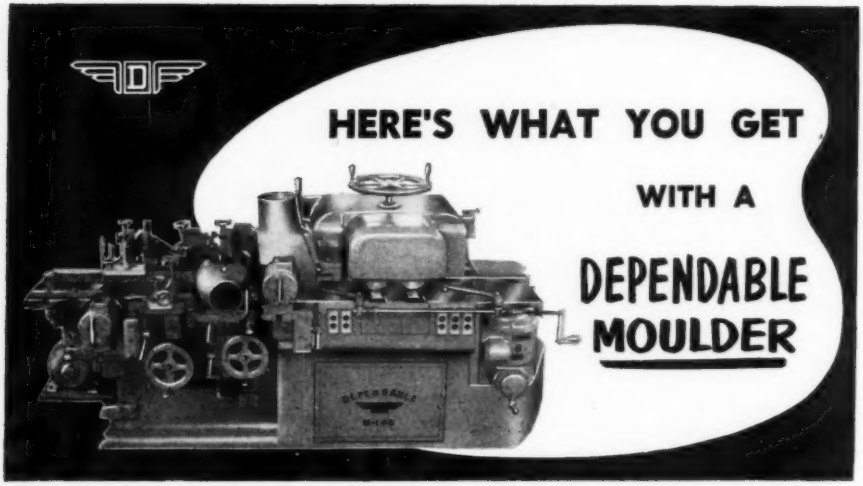


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# Evolution of LUMBER DRYING TECHNIQUES and DRY KILNS

**By Paul H. Graham**

FOR efficient operation the dry kiln construction requires an effective moisture or vapor barrier unless only air-dried lumber is being dried or the walls are made of some type of masonry. This is especially important where insulation is used, to keep the insulation dry and maintain its full insulating value. Where walls and ceilings are insulated, it is generally recommended that the barrier be on the inside not on the outside. Some of the commonly used barrier materials are asphaltum paper, tar paper, roll roofing, slater's felt and aluminum foil or sheets. For high temperature kilns, electrolitic copper mounted on paper is used, but this material is rather expensive for conventional dry kiln applications.

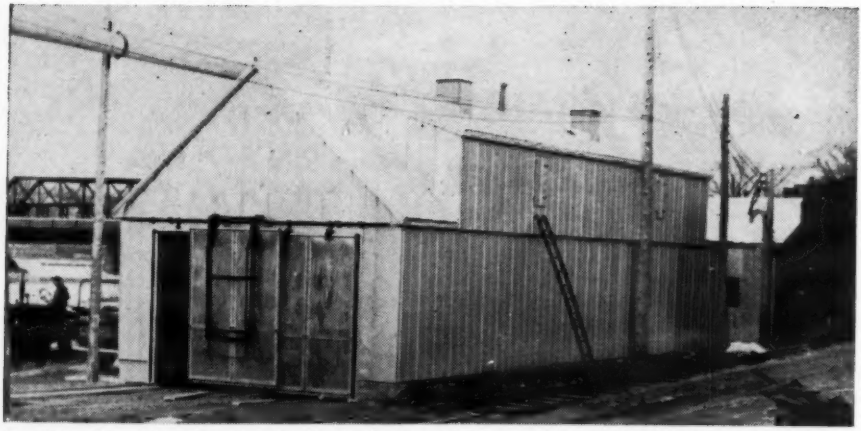
Inside kiln walls usually need to be covered with suitable kiln paint, mastic or plaster, of a type that will not soften at kiln temperature. This provides protection against both moisture and corrosion. Asphaltum paint is popularly used in this application, as well as many special kiln coating paints made with an asphalt or similar base. Zinc chromate and aluminum paint are also said to provide good protection. Many dry kiln manufacturers advocate lining the kiln internally with aluminum to better resist corrosion.

When German dry kiln manufacturers first developed their highly publicized high temperature kilns, these kilns were made of steel and despite protective coating, suffered severe corrosion. The substitution of aluminum sheets eliminated most of the corrosion troubles.

The destructive action of corrosion on metal has also led to the use of copper nails and brass screws for interior fastening. Acid vapors in the kiln air have been known to affect deterioration of galvanized or wire screws and nails in the short space of six months when such woods as hemlock, oak or redwood were being dried. Aluminum bolts are also used in assembling some of the prefabricated kilns to prevent erosion and asphaltum primer cement has been used to apply aluminum sheets.

## KILN INSULATION

The primary function of kiln insulation is to prevent heat losses when building materials used have a high U value and are naturally subject to high



*Dry kiln of wood construction is sheathed with aluminum siding on the outside, with air space provided under the sheathing.*

heat loss. Insulation also serves to prevent troublesome condensation and reduces the amount of steam required for drying. While ordinary prefabricated quilt insulation sewed between waterproof paper has not appeared to function satisfactorily in dry kiln applications, combination materials which often combine both insulation and vapor barrier have been quite successful.

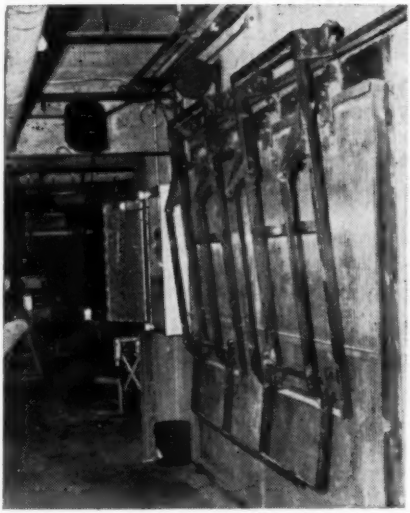
Typical of these combination materials are treatments using aluminum foil sheets applied over the next to inside layer of insulating board, with lapped edges covered with asphaltum or similar material, and aluminum sheets overlaid with mineral wool in a sandwich panel.

Insulation materials most common in current use include: dry sawdust (preferred fireproofed), rock wool, mineral wool, Fiberglas wool, loose asbestos, asbestos and cement board, fiberboard, composition board, asphaltum paper, roofing paper, tar paper, corkboard, ground cork, air-cell panels of various skins, and treated canvas and cloth. Used in high temperature dry kilns, Fiberglas insulation is said to provide maximum efficiency for high temperatures (up to 600 degrees F.), fire safety and rigidity of form.

## ADVANTAGES OF WOOD CONSTRUCTION

Builders experienced in dry kiln erection advise that the wooden building construction will best accommodate

This series on the evolution of the dry kiln—and lumber drying techniques in general—has appeared regularly in WOOD WORKING DIGEST for the last year. Mr. Graham, who has done a great deal of research to gather this information together, plans an exhaustive study to cover the entire field of lumber drying.



Courtesy Crosby & Siegars, Inc., Portland, M

*Patented carrier used to open, close and carry aluminum kiln doors.*

free use of insulation for walls and roofs. Masonry construction usually requires the use of furring strips unless steel structural members are incorporated in masonry construction to bear insulating panels.

About every type of material available has been used in the construction of kiln buildings. Wood has been and still is the favored material, due mainly to its low initial cost, ready availability, ease of repair, and natural resistance to heat loss, even though safer and more permanent kiln buildings are made from other materials. In modern dry kiln design, however, wood is combined with other materials which contribute to better insulation and general tightness of structure to prolong working life expectancy.

Results of a study made of wooden kiln buildings reported that wooden kiln doors seldom lasted more than 5 years without constant repair and maintenance. Deterioration was said to be due primarily to the action of heat and absorption of moisture, and painting only slightly prolonged service life.

Life expectancy of wooden kiln walls was placed between 3 and 7 years, unless constructed with proper insulation, thoroughly caulked, to make the kiln moisture-tight. Damaging deterioration of the wooden structure was laid to acid hydrolysis of the cellulose of the wood used, caused by heat, humidity and acidic conditions, aided by the attack of acid vapors on the metal fastenings. Condensate in the roof structure was said to increase the acid concentration to accelerate degrade of the roof construction.

Protective painting has been used to improve the longevity of wooden kiln buildings. Where the exterior walls were painted with a barrier coating, such as aluminum paint, this only served to increase the acid concentration in the wooden walls. Painting the interior walls tended to increase protection against acid vapors before they could penetrate the walls.

*Interior of wooden dry kiln shows standard joist construction without ceiling.*

Best results were reported when wood used for dry kiln construction was kiln dried or well air seasoned and further treated with wood preservative and fire-retardant protective solutions. While practically any good straight grained wood was used for frame timbers, species with low shrinkage rates were preferred for other construction members. Woods that were reported to be best suited for kiln building construction included: Douglas fir, cedar, cypress, redwood and spruce.

## MASONRY CONSTRUCTION

Masonry kiln construction provides far greater life expectancy than wood, ranging from 20 to 50 years with proper maintenance, but is more costly, more difficult to erect, and relatively low in moisture resistance and heat-insulating properties. Its principal advantage is that it is fireproof. Materials commonly used for masonry kiln construction are cinder blocks; terra-cotta tile; bricks; concrete—solid, monolithic, waterproof and reinforced; concrete blocks and stone.

Steel is frequently used for reinforcement, framing and interior kiln foundation, and sometimes as brace rods, to prevent sagging tracks and fans and steam pipes. In combination with other materials and/or with protective coating, it is often used in sheet form. Aluminum sheeting and structural aluminum panels are commonly employed. Aluminum extruded shapes and angle frame are also used extensively in the construction of prefabricated dry kilns.

The natural porosity of cinder blocks confine their use mainly as an exterior combination material, used with other materials that afford adequate protection against vapor penetration and heat loss. When used for inside walls they are usually coated with asphalt mastic or similar moisture barrier material. One dry kiln covered in this study had its walls constructed of an interior 4″ cinder block wall, a 4″ space filled with mineral wool insulation, and an 8″ cinder block exterior wall. The interior walls were coated with an asphalt-base kiln coating material.

Terra-cotta tile is a popular kiln construction material, especially when used as backup tile for the inside with brick veneer, concrete blocks, etc., used for the outside. They are sometimes stuccoed on the outside instead of being faced. Soft or thin tile is not often used. It disintegrates with moisture and partition type tile is not suitable for dry kiln construction. Most satisfactory results have been obtained with dense, thick, load-bearing, hard-bake tile.

Bricks for use in kiln building construction are usually hard burned, of the common or face type, which are impervious to moisture and do not disintegrate like the common soft brick. Common or soft-burned bricks have such a degree of porosity that treatment of plaster and protective paint is required to seal them against moisture. Common brick is said to have capacity to absorb more than a pint of water.

Poured concrete is seldom used above the kiln foundation and must be waterproofed where it will be subject to contact with ground water. When solid or monolithic concrete is used for kiln walls, it must also be waterproofed to prevent excessive moisture absorption.

*Siding of wood construction dry kiln is flared at bottom for ventilation.*

Heat loss through concrete walls is relatively high. Reinforced concrete is subject to concentrated expansion cracks.

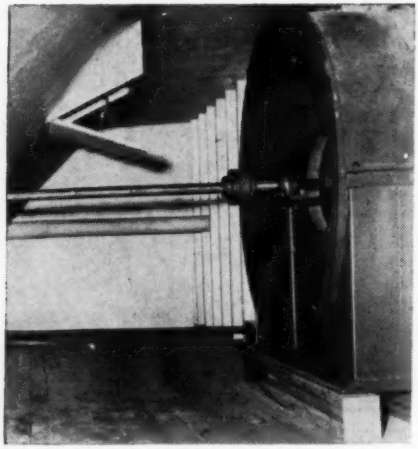
Concrete block also requires waterproofing and protection of mastic, paint and plaster, due to natural porosity. Their deterioration is accelerated by expansion and contraction caused by kiln drying conditions. Aggregate blocks are generally preferred for dry kiln construction, with type of aggregate governing insulating properties to a large extent. The most common aggregates are gravel, hard-burned cinders, expanded blast-furnace slag and burned clay.

Tile, brick and blocks perform best when laid up in tempered mortar or pure cement and sand with no lime. Lime mortar will disintegrate from attack by acid vapors and crumble from moisture. This weakness tends to make the masonry construction porous and holes are eventually formed in the joints. Builders report that good life insurance is provided by coating all mortar joints with an adequate protective coating that will resist high temperatures and humidities and corrosive acid vapors inside the kiln.

Native stone is not widely used as a kiln construction material and properties vary considerably to make their use somewhat of a gamble. A kiln building that is reported to provide very efficient kiln drying conditions was built in Arkansas with 14″ thick walls built of native cobblestone. A completely fireproof structure is provided by the use of metal-insulated doors and a roof of reinforced concrete.

## IMPORTANCE OF FOUNDATION

A poor or insecure foundation has been the downfall of many a dry kiln whose construction was otherwise sound. It is generally recommended that footings be extended well below the frost line and that they be made substantial to prevent settling. Their width or bearing area is usually determined by the character of the soil and the loads to be carried. Foundations are usually made of poured concrete, although concrete blocks may be used, and are best carried above the ground line. Foundation walls above the subfoundation generally extend from 6″ to 12″ above the ground.



*Attic room of dry kiln housing fan and control equipment is ventilated to remove moisture passing through the ceiling.*

If wood walls are to be used above the grade, the foundation walls are generally made from 10″ to 12″ thick; or, if masonry walls are to be used, they approximate the thickness of the wall to be supported. A common concrete mixture for footings and foundation is prepared on the order of 1 part cement, 2 parts sand and 4 parts crushed stone, well mixed and waterproofed if subject to wet ground conditions.

Some dry kilns have their trackage system and heating coils mounted upon reinforced concrete piers, leaving the natural soil bottom exposed. In other kilns the soil is leveled off to be used as a floor. Often sand or cinders are spread over the soil to provide a better floor. The most popular floor is of concrete, from 4″ to 6″ thick.

Few concrete floors are insulated but better results have been reported when cinders, sand, etc. were spread over the soil to act as an insulator for the concrete floor slab. A drain is needed to carry off water. Some prefabricated dry kiln manufacturers require ducts to be cast when the concrete floor slab is poured, using collapsible forms. Studs are also cast into the slab by means of templates to take the plates of the metal kiln building.

## STRENGTH OF KILN WALLS

Kiln walls are required to be constructed with sufficient strength to support the roof and any kiln equipment, overhead fans, motors and shafting, that may have to rest on the walls. The walls should be of tight construction and made of material and treated to provide adequate insulation against heat loss, resist acid vapors, and prevent moisture absorption and kiln leakage.

Wood is often used for all construction above grade. The walls may be either of standard stud construction or crib construction, with various insulating and vapor barrier treatments being used to protect against heat loss, vapor penetration, moisture and steam transmission, condensation and decay. This is an economical method of construction.

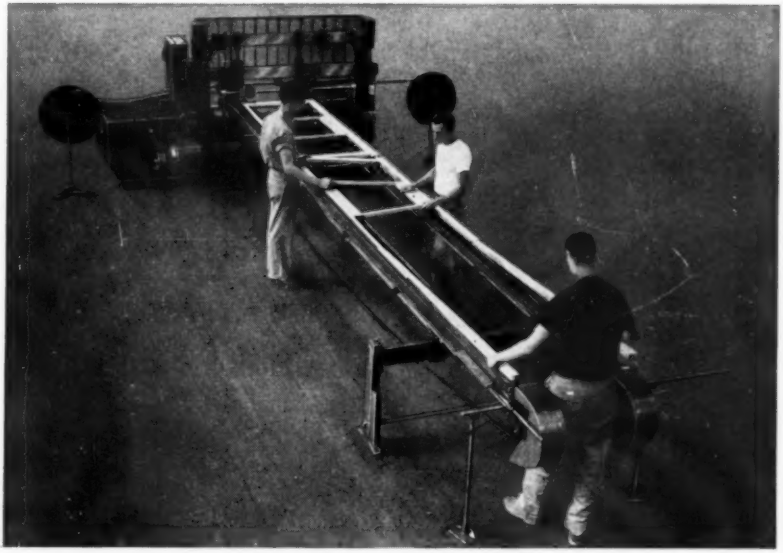
In the conventional standard stud wall construction, 2 x 6″ studs are usually used on 16″ centers, sheathed inside and outside with 1″ sheathing. Inside sheathing is laid horizontally and is generally shiplap or matched lumber. Exterior sheathing is usually shiplap, covered with drop or beveled siding. Shingles may be used and aluminum sheathing is used on the outside of some modern dry kilns, with a space provided underneath the sheathing for air.

Wood exposed to kiln conditions is usually nailed at least twice at each stud, in the middle and at the bottom

SARANAC *Specialized* FASTENING MACHINES SOLVE PROBLEMS

CASE HISTORY NO. 1

# SARANAC MACHINE BOOSTS PRODUCTION 900% PER MAN-HOUR



**YES, 900% IS CORRECT!** This is just one dramatic example of how specialized Saranac Machines often cut production costs astonishingly! In many cases—perhaps yours — a *standard* Saranac Machine, large or small, can deliver equally important savings in time and labor.

**IN THE CASE ABOVE,** the machine is a special multiple-head corrugated fastener driver, manufacturing modern flush door frames. Where 3 men formerly hand-fastened 53 door frames per hour total, they now produce 480 per hour! Quality is more uniform too.

**IF YOU HAVEN'T INVESTIGATED** the capabilities of Saranac Wire Stapling Machines—or Corrugated Fastener Drivers—do it now! Describe your problem and send samples of material if possible. We'll reply with suggestions.

**SARANAC MACHINE COMPANY**
BENTON HARBOR, MICHIGAN

*Manufacturers of the World's Largest Line of Fastening Machinery*

FIELD
SINCE 1[illegible]

CHAIN MORTISE
CUTTING EQUIPMENT

A TOOL ROOM Product
By A Tool Room Expert!

Use our double bearing guide bars for flat bottom mortises. The riveted plate and bearing construction provides the utmost in strength and interchangeability. More than 90 standard and many special sizes of cutting equipment in stock. We are well-equipped to furnish special sizes like the above bar in many widths and lengths.

Write for complete information on our chain mortising equipment.

WILLIAM H. FIELD CO.
327 Dorchester Ave. Boston 27, Mass.

of the board, to provide sufficient come-and-go allowance to compensate for changes in dimension caused by shrinking and swelling of the wood during the kiln run.

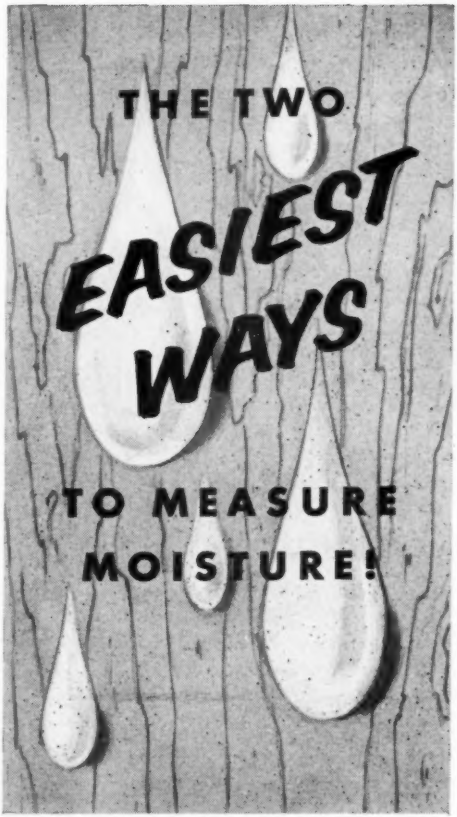
Outside walls may be sheathed on both sides, or sheathed inside and plastered outside. Waterproof sheathing paper is frequently used between exterior siding and sheathing for heat insulation, and slater's felt and tar paper are popular materials for this application. Loose insulation is often used between the studs, and/or some form of insulating board, such as asbestos cement board. Used on the inside, this is coated with asphaltic or similar protective kiln paint.

## VAPOR BARRIERS AND TYPE OF CONSTRUCTION

Insulated walls require a vapor barrier to be applied under the interior sheathing and the sheathing is given a protective coating of kiln paint. Vapor barrier material is usually applied vertically over the face of the studs before inner sheathing is applied.

The internal vapor barrier is sometimes formed with aluminum foil or sheeting. Where this type of installation was used in a wooden kiln building, the wood beyond the protective aluminum barrier was found to have a moisture content of only 10 to 11% after one full year of dry kiln operation, and almost negligible corrosion. There was also no noticeable lifting of paint on the outside, indicating the transmission of very little moisture through the wood.

**Wood.**—A kiln engineer specializing in wood kiln building construction recommends stud spacing of 4″ to 6″ facing with matched lumber as support for insulating board, and using



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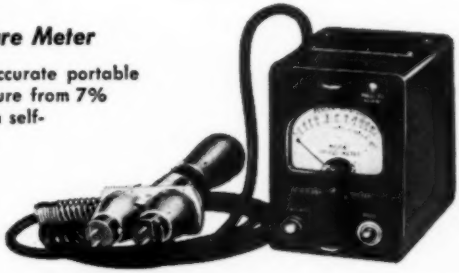
**MOISTURONIC**
***Moisture Meter***

Here is the most versatile moisture meter, yet the simplest and easiest to read. Measures up to 150% moisture on the double-range scale (readings above 30% for comparative purposes). Utilizing the precise resistance principle, it has the same dependability typical of all WESTON instruments. Available in both battery and A-C types, with a sturdy carrying strap. Weight less than 10 lbs. Send for bulletin W7B.

**WESTON** *Midget Moisture Meter*

The smallest, most convenient and accurate portable meter. Instantly indicates wood moisture from 7% to 30%. Weight less than 4 lbs. with self-contained batteries. Unequalled for quick, portable use—checking lumber, lath, shingles, plaster walls, plywood, etc. Send for bulletin W2C.



**WESTON** *Moisture Meters*

WESTON Electrical Instrument Corporation, 614 Frelinghuysen Ave., Newark 5, N. J.

# Sharpens, bevels each tooth as it comes along

**ONLY Y 18 HAS THE AUTOMATIC SWIVEL**

Only the Y 18 can sharpen cross cut saws in one operation. Automatic swivel enables each tooth to be sharpened as it comes along. Eliminates a second set up. Every bevel is uniform, all points balanced. Sharpens rip saws too. Write for bulletin describing Y 18.

**AC 38 CIRCULAR SAW SETTER**

Sets teeth at a speed of 150 to 200 per minute on saws with diameters from 5" to 38".

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Cleveland 9, Ohio

Maker of largest line of saw filing machines.


from 1 to 4 thicknesses of 25/32" insulating board over the lumber facing. He believes that moisture cannot be kept out altogether but that most of it can be sealed out by plastering the inside with an asphalt-base kiln coating or roofing compound.

A treatment claimed to provide an almost 100% vapor barrier, involves the use of aluminum foil sheets over the next to the inside layer of insulating board, covering the lapped edges with black asphaltum so that steam or moisture will not penetrate, and covering this construction with an inner layer of insulating board and painting it with a good kiln paint.

To keep moisture out of the studding and lumber, this kiln engineer advocates leaving spaces at the bottom and top of the wall to permit it to escape up into the overhead instrument control room. This control room is venti-

*"Nervous? Not me — I got my speech all prepared!"*

lated with louvers at each end to circulate air through it. With cool air given a chance to get into the bottom, the heat of the kiln operates to induce an updraft to carry moisture out of the wall structure.

Crib wall construction is used mainly where lumber is cheap and/or a slow-burning building is required. This type of kiln wall construction has been favored by sawmills of the West Coast. It is usually made of 2 x 6″ or 2 x 8″ dressed stock laid flat, one on top of another, and spiked together solidly. This crib construction is said to produce a strong wall with good insulating properties, if the stock used is good and dry.

Better insulation is provided by facing with roofing paper, or similar material, and covering it with wood siding. Paint and vapor barrier materials may be applied to these walls in a fashion similar to treatment of standard stud frame walls. Crib walls have been built of green lumber in the past, but shrinkage opened up cracks and distorted the wall construction so that doors would not open or close tight, to reduce and even destroy the general efficiency of the dry kiln equipment. Due to their slow-burning characteristic, crib walls generally enjoy more favorable insurance rates than other forms of wood construction.

## CONCRETE

Poured concrete is not generally favored for dry kiln walls, but where it is used the outside walls are usually made at least 12″ thick and partition walls a minimum 8″ thickness. Stiffness of these walls is increased by the use of pilasters every 20′. Expansion joints are also required for best re-

C.I.T. Terms Available
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*Jacksonville, Florida*
P. O. Box 3687

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**BLO-HOG** (The only all-purpose hog in the world) Patents Pending

***EATS UP EVERYTHING***

. . . including Pine, Oak, Gum, Hickory, Elm, Cedar, Wet Veneer and Sandy Bark. Conveyorfed — no attendant required. Positively protected from major damage by tramp steel. All connections locked — nothing to shake loose. Maintenance costs unbelievably low.

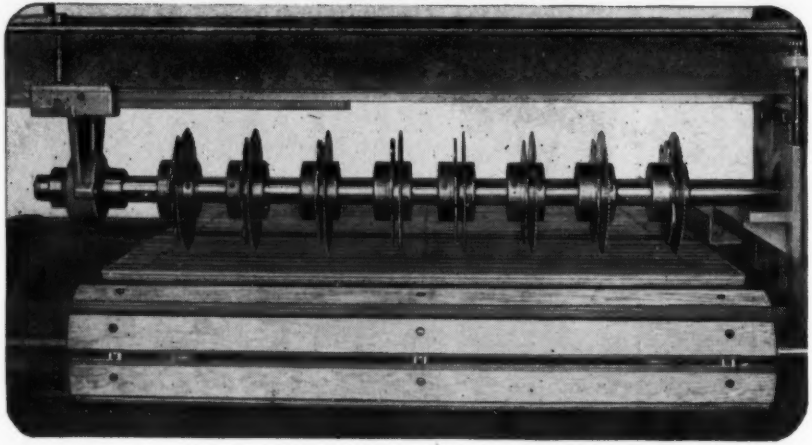
*". . . Dear Mr. Montgomery: It is an unbelievable machine and it is still hard to believe that it is actually handling the enormous volume of scrap we are feeding into it. We operate the hog without an attendant—which means a considerable saving."* — J. B. BLACK, Ocala Mfg. Co., Ocala, Fla.

Sumner Iron Works, Everett, Washington, W. Coast Rep.
Canadian Sumner Iron Works, Ltd., Vancouver, B.C., Canadian Rep.

*with the* **MEREEN-JOHNSON NO. 435-H**

# YOU GET ALL 4

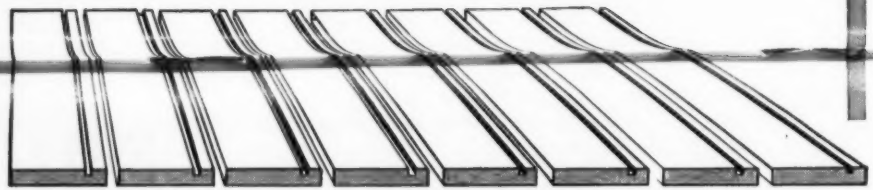
## MULTIPLE CUT-OFF...
## MULTIPLE GROOVER...
## MULTIPLE RIP SAW...
## EQUALIZER

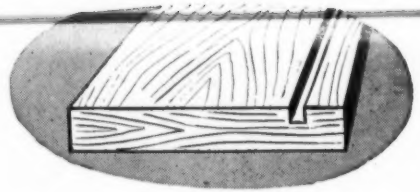


Arbor set-up for multiple drawer front work.

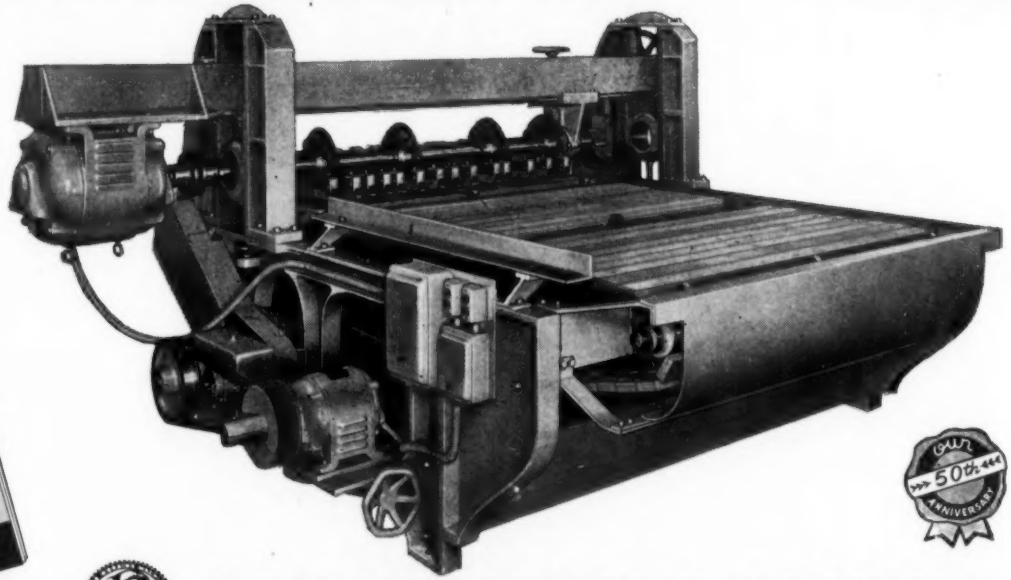
**THESE 4** are only a few of the uses for the versatile M-J No. 435-H Slat Bed Machine. Installations in furniture factories have proved that this machine will produce parts formerly manufactured on variety saws and by other hand operations. This machine is available in a wide variety of sizes and with practically any number of saws and groovers or saw and groover combinations. It's one of the most adaptable machines ever designed for use in a modern woodworking, plywood or furniture plant.

- **Trims ends of an entire case front, while notching or easing edges of drawer front ends.**
- **Sizes and squares plywood to ceiling and wall squares.**
- **Rips a complete panel into bed rails in one pass.**





8 identical drawer fronts ripped and grooved in one pass.



Write for the
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**MEREEN-JOHNSON MACHINE CO.**

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| | | | |
|---|---|---|---|
| CUT-OFF SAWS | DOUBLE CUT-OFF SAWS | MULTIPLE CUT-OFF SAWS | GANG RIP SAWS |
| TENONERS | VENEER & PLYWOOD SIZERS & JOINTERS | | RESAWS |

sults, usually a ½″ joint for every 40 feet of wall length.

Insulating board is sometimes applied over the inner wall to furnish insulation against heat loss. It is painted with kiln paint to improve resistance to moisture and acid vapors. An elastic cement, plaster or mastic may also be applied to the inner wall surface.

Concrete block walls require similar treatment for protection, and are usually laid up in 8″ and 12″ thickness. Where fireproof roofs are used and/or kilns of 50′ or longer, both exterior and interior walls are usually built 12″ thick. When little or no insulation is used, the inside wall surfaces usually receive a standard treatment of a coat of plaster and one or two coats of kiln paint or mastic.

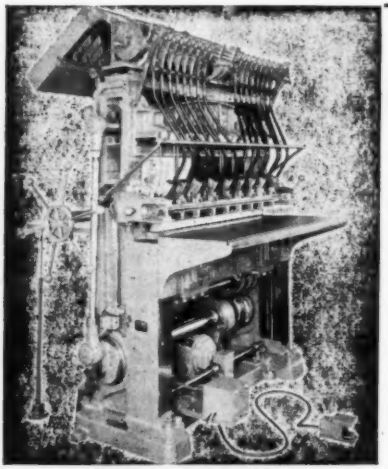
## BRICK

Brick kiln walls are best made of hard-burned brick, about 13″ thick, and give better service when strengthened with pilasters not more than 20′ apart. Some builders lay outside walls up 12½″ thick and make partition walls 8″ to 10″ thick. Inside exposed faces are given one or two coats of kiln paint as well as a coat of elastic cement plaster. Provision of properly spaced expansion joints is also required to prevent damage to the wall from repeated expansion and contraction.

Air spaces are also provided as an aid to insulation. In a typical application of this principle, the kiln wall was made of two layers of hard-baked glazed brick, with a 1″ air space provided between the layers, and a moisture barrier on the inside.

## TILE

Terra-cotta tiles used for kiln wall

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DOIG AUTOMATIC NAILERS

Standard Doig Features

1. Anti-friction bearings.
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3. Nail feeder to handle nails from 1 to 3 inches without additional parts required.
4. Nail feeders to give 12 separate nailing combinations.

NEW FEATURES

A. Wheel on left allows operator to adjust back gage from operating position.
B. Solenoid trip permits operator to trip machine at any position desired.

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WILLIAM S. DOIG Inc.

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construction are usually of the hard-burned, load-bearing type, about 12 x 12″ in size. They are used for full thickness walls or as backup tile for the inside with brick veneer or blocks on the outside. Most builders seem to prefer tile that has openings running horizontally rather than vertically in the wall and tips scored for plastering. Both sides of tile walls are plastered with cement mortar.

Full tile walls are usually at least 12″ thick and are reinforced with pilasters not more than 20′ apart. Interior wall faces are treated, insulated and protected by paint and vapor barriers, similar to other masonry walls, and similar expansion joints are provided.

In a typical kiln wall construction the exterior wall was 13″ thick, with the outside built of brick and the inside of tile. The interior wall was also 13″ thick, built of 8″ and 4″ backup tile, laid so as to break the joints both vertically and horizontally. In this manner two smooth and impervious walls were obtained. Hard-baked hollow glazed terra-cotta tile was used, with a moisture barrier on the inside.

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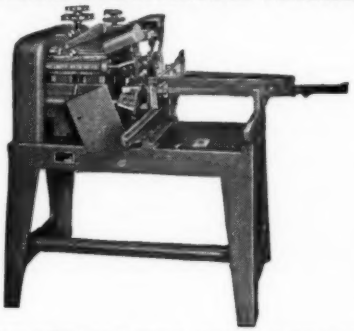
Do not resent growing old. Many are denied the privilege.


**HARRIS**
**DELUXE FLOOR MODEL TENONER**



**New adjustment** allows exact and simultaneous adjustment of tenon spindles.
**3 H.P. Motor**
**3 Inch Blades**
**V Belt** pulley drive on both tenon and cope spindles.
**Heavier Construction** for greater accuracy.

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**13 WATERS STREET, MILLBURY, MASS.**



**NEWMAN**
**HEAD GRINDER**
Pedestal Type
**G-16**

**FOR ALL CUTTERHEADS**

**Grinds all heads up to 11″ in diameter and thick or thin knives up to 16″ long**

**Double Spindle Grinding Head Two Grinding Wheels--- One flat & one saucer wheel**

**$495.00**
F. O. B. GREENSBORO, NORTH CAROLINA

DETAILS ON REQUEST
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Table glides smoothly on roller bearings and moves vertically on worm gear rack & pinion drive.

***FAST DELIVERY FROM STOCK***

**NEWMAN MACHINE CO., Inc.**
GREENSBORO, NORTH CAROLINA, U. S. A.

# Award of Merit Winners Announced

More than 500 delegates registered for the Ninth Annual Meeting of the Forest Products Research Society held in Seattle, Washington, June 20-23. The three-day program included many technical sessions as well as some excellent field trips.

At the official luncheon of the organization, WOOD WORKING DIGEST Awards of Merit were presented to 11 organizations. Robert C. Van Kampen, president of the Hitchcock Publishing Company, presented the awards.

The WOOD WORKING DIGEST Award of Merit is given each year to companies, colleges and associations in recognition of outstanding service in

*Front row, left to right—Vic Downing, Elliott Bay Lumber Co.; W. G. Soderquist, Hardwood Dimension Manufacturers Assn.; Robert E. Mahaffay, West Coast Lumbermen's Assn.; Walter H. Koepp, Michigan College of Mining & Technology; M. H. Nordquist, Architectural Woodwork Institute; Donald Fuller, Architectural Woodwork Institute.*

*Back row, left to right—R. C. Van Kampen, Publisher, WOOD WORKING DIGEST; William Hulbert, Jr., Western Red Cedar Lumber Association; Dr. Eric Anderson, State University of New York College of Forestry; Gilbert R. Twyman, Mississippi Products Company; Henry I. Trowbridge, Wood Office Furniture Institute.*

*Dependable Machine Company and The Borden Company also won awards, but recipients were not present when picture was taken.*

the promotion of wood and wood utilization. The contest is open to any organization—regardless of size.

Stories about the winners will appear from time to time in our magazine. Here are the winners.

---

**1954 Award of Merit Contest**

The following received first place citations in the class shown:

ARCHITECTURAL WOODWORK INSTITUTE, Chicago, Illinois—C
Recipient: M. H. Nordquist of Seattle, Wash.

DEPENDABLE MACHINE COMPANY, Greensboro, N.C.—E
Recipient: No one present.

STATE UNIVERSITY OF NEW YORK, College of Forestry, Syracuse, N.Y. —F
Recipient: Dr. Eric Anderson, Syracuse, N.Y.

MISSISSIPPI PRODUCTS COMPANY, Jackson, Miss.—B
Recipient: Gilbert R. Twyman, Jackson, Miss.

WEST COAST LUMBERMEN'S ASSOCIATION, Portland, Ore.—A
Recipient: Robert E. Mahaffay, Portland, Ore.

The following received honorable mention citations in the class shown:

WESTERN RED CEDAR LUMBER ASSOCIATION, Seattle, Wash.—A
Recipient: William Hulbert, Jr., Everett, Wash.

WOOD OFFICE FURNITURE INSTITUTE, Washington, D.C.—C
Recipient: Henry I. Trowbridge

ELLIOTT BAY LUMBER COMPANY, Seattle, Wash.—E
Recipient: Vic Downing, Seattle, Wash.

THE BORDEN COMPANY, New York, N.Y.—C
Recipient: H. H. Clarke, Jr., Seattle, Wash.

HARDWOOD DIMENSION MANUFACTURERS ASSOCIATION, Nashville, Tenn.—A
Recipient, W. G. Soderquist, Asheville, N.C.

MICHIGAN COLLEGE OF MINING & TECHNOLOGY, Houghton, Michigan—F
Recipient: Walter H. Koepp, Houghton, Michigan.

Class A—Lumber, dimension stock, veneer and plywood.

Class B—Products made from wood waste.

Class C—Finished wood products.

Class D—Wood components for structural or other parts.

Class E—Machinery and materials that make an expanded use of wood possible.

Class F—Colleges and Universities.

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*Fuller*

**Straight Shank Taper Point Drills**
**COUNTERSINKS — COUNTERBORES**

To Bore in Wood for Heads of Wood Screws, Rivets, Nails, Spikes and Bolts. These tools are adjustable up or down on twist drills and only one tool is needed for any length of screw of each size.

**Type C**—Countersink - Counterbore. Cuts Bevel Bottom hole. Stock Sizes for No. 5 to No. 18 Wood Screws. Counterbore sizes 3/8", 7/16", 1/2" and 5/8".

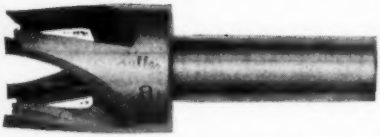
**Type B** — Counterbores for Bolt, Nail and Spike heads. Cut Flat Bottom holes. Stock Sizes 5/8" to 1½" diameters, by 8ths. To mount on twist drills 3/16" to 3/4" by 16ths.

**Type R**—Counterbores for Rivet heads. Cut Flat Bottom holes. Stock sizes 3/8", 7/16", 1/2" Counterbore diameters.

R

X

**Type X** — High Speed counterbores. Cut Flat Bottom holes. Stock sizes same as Type B Counterbores.



**Plug Cutters to cut plugs ¼" to 1¼"**

*W. L. Fuller*

**1165 WARWICK AVENUE**
**PROVIDENCE 5, R. I.**

Another contest is planned for next year—entries should cover the work done by any group in 1955. Watch for announcement in a later issue.

**Officers Elected**

At the annual business meeting of the FPRS, the following new officers were elected: Moss B. Christian, Chicago Mill & Lumber Co., Tallulah, La., president; Ralph H. Bescher, Koppers Co., Pittsburgh, Pa., president-elect; Dr. Frank H. Kaufert, University of Minnesota, St. Paul, Minn., vice-president.

Membership in this organization continues to grow. We believe it to be one of the most worthwhile organizations that any woodworker can join. In addition to the national meeting, individual sectional meetings are held at frequent intervals across the country. The objectives of the society are to cover research, development, production, distribution and utilization of wood and wood products. In these meetings industry leaders share their problems and their successes in solving these problems.

The next annual convention will be held at the Civic Auditorium, Asheville, N.C., under the chairmanship of Dr. E. S. Harrar, Duke University, Durham, N.C. This is scheduled for next spring.

**BASS BUYS DEWELSAW**

**Rudolph Bass, New York distributor and wholesaler of industrial metal and woodworking equipment and supplies, has expanded its facilities through the recent purchase of Dewelsaw Machinery & Tool Corp., New York.**

**"The acquisition of Dewelsaw will enable Rudolph Bass to better serve the increasing industrial population within a 200-mile radius of New York City," states a company spokesman.**

# *Appointments*

**Thomas E. Berry** has been named assistant to Truman Jones, general sales manager for DeWalt, Inc.

Henry Disston & Sons, Inc., announce the appointment of **J. M. Jernigan,** Lancaster, S.C., as sales and service engineer for the industrial division.

Rockwell Manufacturing Company, Delta Power Tool Division, has named **Bernard D. Cox** as advertising manager.

Two officials of the company have been promoted. **Byron E. Coon** has been named sales promotion and merchandising manager of the division and **John P. MacCrossen** has been appointed western regional manager, succeeding Mr. Coon.

**Fred B. Smales,** formerly western division manager, has been elected a vice-president of the United States Plywood Corporation.

Three executive promotions have been announced by the Atkins Saw Division of Borg-Warner Corp. **Carl J. Meister,** previously vice-president, sales, has been named executive vice-president and assistant general manager of the division. **Robert M. Zimmerman,** formerly general manager, operations, has been elected vice-president, manufacturing. **Howard O. Wiesen** has been promoted from assistant to the president, to vice-president, administration.

**F. M. Metcalfe** has been promoted to eastern regional sales manager, coated abrasives and related products, for Minnesota Mining & Manufacturing Co.

National Casein announces the appointment of **Richard Thomas,** wood **technologist,** to their laboratory staff at Riverton, N.J.

**Oliver A. Gottschalk,** formerly assistant to the president of the Carborundum Company, has been elected treasurer-controller of the company. **George J. Zimmerman** has been named assistant to the president.

Yates-American Machine Company has announced the appointment of **Walter E. Schutz** as sales manager of the firm's newly formed power tool division.


**HIGHER PRODUCTION AT MINIMUM CUTTING COST**

*Possible thru using*

**DETROIT KNIVES**

**PLANER-MOULDER**
**VENEER-CLIPPER**
**SHAPER STEEL**

**70 YEARS**
**Devoted to Knife Making, EXCLUSIVELY!**

A fine reputation built up thru the years—Leading Mills prefer DETROIT Knives—Fewer Sharpenings—Longer life—High Production.

*Write for them, today.*

***Better knives since 1885***

**DETROIT EDGE TOOL CO.**
6570 E. NEVADA
DETROIT 34, MICHIGAN

Appointments of three men to executive posts in the sales organization of the Behr-Manning Division of Norton Company have been announced. **Thomas Trowbridge** has been named assistant general sales manager; **William J. Bennett** has become sales manager for the company's eastern region; and **Victor F. Perreault** has been appointed industrial trades manager.

**Benjamin T. Cardinal** of Ann Arbor, Michigan, has been appointed managing director of the Fir Door Institute with headquarters in Tacoma, Wash. He will direct trade promotion activities for the group which produces a large percentage of residential doors used in this country.

Wood Office Furniture Institute has appointed **Robert A. Spelman,** formerly assistant executive secretary, to the position of executive secretary of the national trade association. E. Howard Gatewood, Jr., has resigned from this position to accept the post of vice-president in charge of sales of the Taylor Chair Co., Bedford, Ohio.

**Larry T. Marshall,** Arcata, Calif., has been named manager of M and M Wood Working Company's California Timber Division. Marshall has been chosen to put into operation plans for selective cutting and the development of fire control systems.

The Douglas Fir Plywood Association has named **James F. Fowler,** formerly managing director of the Fir Door Institute, to the newly created position of director of promotion for the association. Fowler will head up a vastly expanded promotion effort undertaken during the industry's Golden Jubilee celebrated in June.

DeLuxe Saw Company announces the appointment of **Albert Oehl** as regional sales manager and **Ralph Baudendistel** as sales and service engineer.

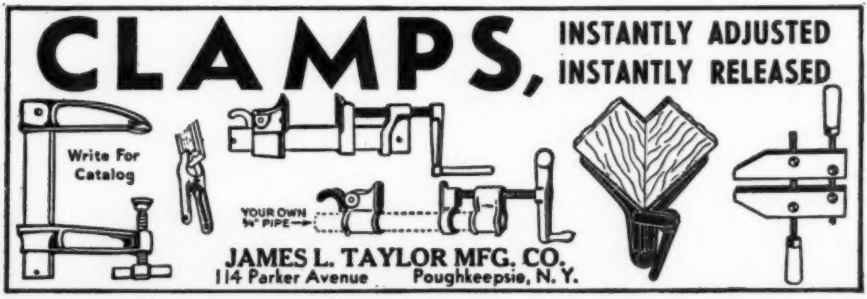
## NUTTING EXPANDS

Nutting Truck and Caster Company, main office and factory at Faribault, Minnesota, announces new warehousing facilities to exclusively serve users of materials handling equipment in the West Coast trade area.

Located at Nutting Truck and Caster Company, 253 - 4th Street, Oakland 7, California, these new facilities include a complete stock of floor trucks, casters, wheels and replacement parts plus maintenance and repair service. West Coast materials handling equipment users will receive quick service from stock shipment, and will enjoy lower freight rates.

## MILLION-DOLLAR ROCKWELL PLANT

Ground has been broken and contracts awarded for construction of a new 104,000 square foot parts plant in Russellville, Ky., for Rockwell Manufacturing Company. Cost of the new plant is said to be in excess of $1 million, exclusive of production equipment. The new plant, slated for completion early next year, will turn out parts for all Rockwell products.

**Chautauqua Hardware Expansion Program**

The Chautauqua Hardware Corporation, Jamestown, N.Y., has begun a major expansion program. This ten-year-old firm recently bought the Empire Worsted Mills, Inc., building at 31 Water St., and plans to be in the new property by mid-summer.

Chautauqua Hardware, which employs between 250 and 300 persons, will carry on all operations in the new building. The firm manufactures furniture hardware, automatic screw machine parts and custom hardware for the woodworking industry.

The company maintains sales offices in Boston, Los Angeles, Chicago, Grand Haven, Mich., New York City and Canada. Its products are distributed throughout the nation.

Allen F. Jones is president of Chautauqua Hardware. Other company officials are: Carl W. Ahlstrom, treasurer and purchasing agent; Leonard A. Magnuson, secretary and general sales manager; and George P. Eddy, vice-president.

---

A few hard knocks usually reduce a swelled head.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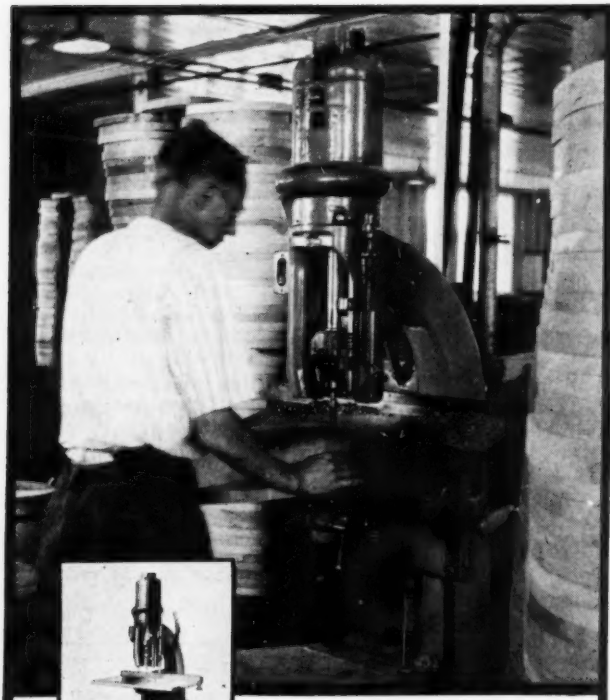

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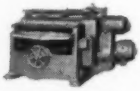
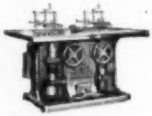


**GREENLEE SIX-ROLL SINGLE PLANER** . . . exceptionally smooth in operation. One of a line of single and double planers for fine work, high production.



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# Right or Wrong?

**A roundup of day to day in-plant problems and how they were handled by management men. Each incident is taken from a true-life grievance which went to arbitration. Names of some principals involved have been changed for obvious reasons. Readers who want the source of any of these cases may write to WOOD WORKING DIGEST.**

*Can an employee be denied a promotion because he is neurotic?*

**What Happened**

Malcolm J. was energetic, competent, hardworking. When a vacancy occurred in the next higher classification, Malcolm put in a bid for the job. This was in accordance with company policy which called for posting of vacancies. Senior men automatically got the promotion unless they did not possess "knowledge, skill, efficiency, adaptability and physical ability required for the job on which the bid is made." The company turned Malcolm down even though he had seniority. It maintained that the new job called for more responsibility and that Malcolm had a tendency to become erratic, excitable and nervous in emergencies.

Malcolm put up a calm defense when the case came to arbitration. He said that this was all poppycock. Psychological characteristics cannot be measured as can output, ability and other factors. He proved that in all his years with the company he had done a good job, never damaging machinery, never doing anything that would endanger any other employee. He admitted that he was occasionally excitable, but defended his traits on the grounds that "so are most people." At any rate, he contended that management should not use such intangible factors as personality traits to deny him a promotion.

Was Malcolm: Right ☐ Wrong ☐

**What The Arbitration Board Ruled**

"It should be recognized that personality traits such as nervousness and excitability are difficult to demonstrate in a judicial proceeding. If a man were disqualified for lack of knowledge, the deficiencies in his training and experience could be readily pointed out. Psychological characteristics are more subtle and therefore less susceptible to iron-clad proof. Nonetheless, they may play a crucial part in a promotion decision. . . .

"The supervisor's reports characterizing Malcolm's personality in general terms were accepted as exhibits over the union's protests. Under the 'intimate acquaintance' rule, however, a supervisor is certainly competent to testify on the general mental condi-

tion of an employee who has worked under his charge for a considerable period of time. Considerable detail was furnished (by company witnesses) concerning Malcolm's actions and reactions. It is true that Malcolm has not been responsible for damage to equipment or injury to other personnel. He has not neglected his duties and, except in one case, has not wilfully disregarded the instructions of his supervisors.

It can fairly be concluded from the testimony, however, that Malcolm does tend to lose perspective when things go wrong. He does have difficulty in distinguishing between a minor difficulty and a major crisis. What is more serious, when encountering difficulties, he tends to reject assistance from higher-rated employees and members of supervision. Keeping in mind the difficulty of proving personality traits in a judicial proceeding, we believe that the company has shown that Malcolm is in fact unduly nervous and excitable in moments of emergency. In view of the job, new duties and requirements, we conclude that the company acted reasonably in rejecting his bid."

*Have workers a right to insist that their supervisor be fired?*

**What Happened**

LaVerne Wake, an employee, went to his foreman, Lou Spaulding, one morning to discuss a promotion. The foreman didn't agree that Wake should be advanced. The conversation became quite heated. After the talk, Wake went back to his workplace and decided to write out a formal grievance. He did so, but instead of handing it to Spaulding, he went over his head and put his case before the plant manager. This executive refused to process it. "Take it to your foreman," he said. "He's the first step in the grievance machinery." Wake did this, but when Spaulding learned that the worker had gone over his head, he became enraged. He tore up the grievance, threw it in the basket, and told the worker to "get out of my office."

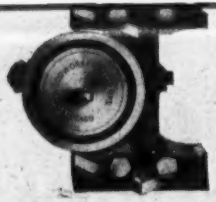
When management learned of Spaulding's intemperate behavior, it called him on the carpet and gave him a severe reprimand. However this didn't satisfy the worker nor the union in the plant. They took the issue to arbitration with a demand that the foreman be fired. They came up with the following arguments:

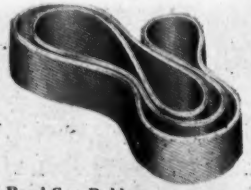
- His presence in the department was causing low morale.
- The foreman misbehaved, as witness the company's own reprimand.
- If he is not fired, other foremen will take advantage of employees.
- In case Spaulding is not discharged, at least he should be demoted for his unmannerly behavior.

The company couldn't see it that way. It held:

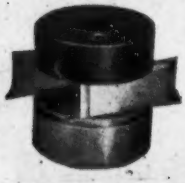
- Spaulding had already been reprimanded.
- The company was willing to reconsider the original grievance

# TOOL UP WITH WOODWORKERS'

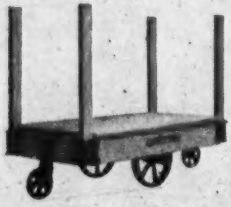

Band Saw Guides


Band Saw Rubbers

Renold Mortise Gear


Ball Bearing Collars

Sand Belt Splicer


Factory Trucks

Glue Joint Cutters

Lumber Meters

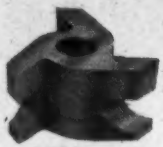
Knife Balance Scales

Cabinet Makers Bench

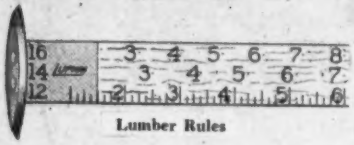
Swing Saw Gauges

Felt and Canvas for Sanders

Planer and Sticker Bolts


Cupboard Door Cutters

Carving Chisels



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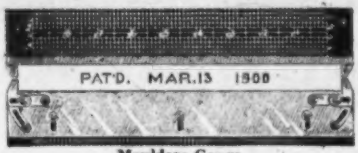

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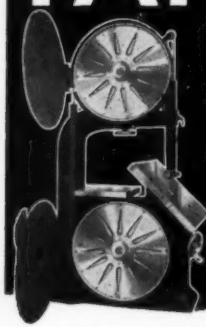

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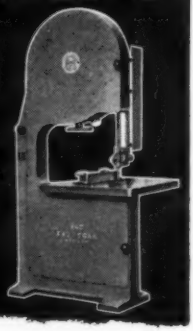

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and have it processed in the normal way.

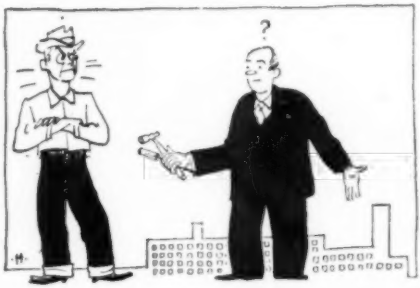
- The worker and/or the union have no right to tell management how to discipline its supervisors. This is strictly a management prerogative.

Was the Company: Right☐ Wrong☐

**What Arbitrator Joseph Klamon Ruled**

"It is true that cases have arisen in which foremen were removed from their jobs at the request of the union, but these have been extremely rare and involved offenses rather shocking in nature. In this case, the position of the union can be sustained only insofar as it contends that the foreman needs quite a bit of instruction relative to proper respect for the dignity and the rights of employees under his supervision.

Foreman Spaulding deserves the rebuke and severe reprimand he has received from top management. However, it is one thing to rebuke a foreman. It is quite another to demand his discharge. After all, a foreman is a part of management. He is a supervisory official. He is selected, promoted, discharged, at the discretion of the company. It is enough to say that the action to be taken in disciplining a foreman is a matter exclusively to be determined by management."



*Is an employee entitled to severance pay if his job is eliminated?*

**What happened**

Ralph Secor started to work for the company back in 1946. He was a mechanic. He progressed until he reached the job of working foreman at a salary of $87.00 a week. The company reorganized some of its operations and the job of "working foreman" was eliminated. However, Secor was offered a job as a mechanic, which was the next lower rated job. It also called for lower pay. This Secor refused to take. The company had nothing else to offer him so he was let go. The policy on severance pay provided that when employees are laid off they were to receive separation pay.

The union took up Secor's grievance, and cited the company's seniority policy as a basis for its case. This policy read, "The principal of seniority is hereby recognized and will apply in all cases of promotion, transfer and job preference, reduction or restoration of the working force." The union argued that this clause gives a worker preference in jobs based on seniority but does not compel him to accept a lower rated job when the work force is being reduced. Failure to keep him employed in the higher job, therefore, said the union, entitles a man to severance pay.

The company countered that it had a right to eliminate a job if it saw fit. Secor was offered the next job opening in line with his seniority. If he chose not to take it then he is considered as having resigned, and entitled to no severance.

Was the Company: Right ☐ Wrong ☐

**What Arbitrator Philip Taft Ruled**

"A worker who has lost a higher paid job because of contraction of work cannot argue that he is laid off if the company asks him to take a lower rated job which his seniority entitled him to hold. A worker who has achieved a given classification need not be retained at that level irrespective of the labor needs of the company. Severance pay is denied."

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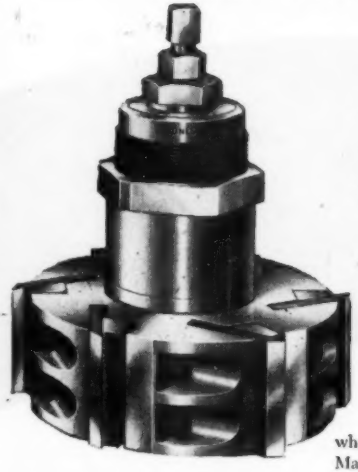
# "We put 'em on and forget 'em!"



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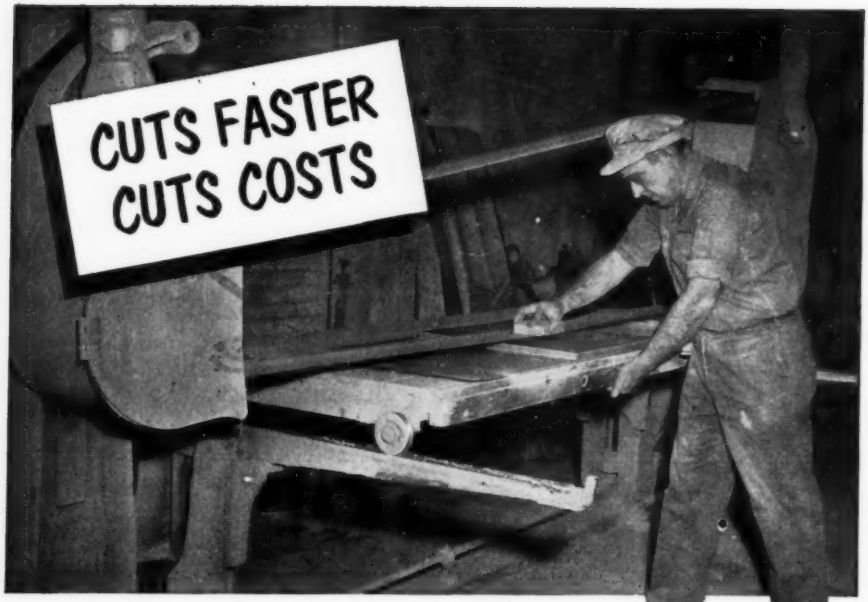
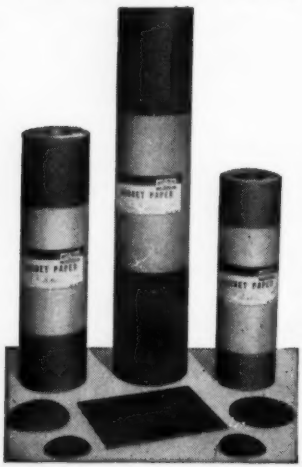



## "On the JOB" tests show savings over premium priced abrasives...



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Customers tell us that "on the job" tests have proven Mid-West Resin Seal Garnet to be superior to other coated abrasives costing much more. That is why we urge you to make a test run with Mid-West and compare it with the brand you are now using.

Designed specifically for the woodworking industry, Mid-West Resin Seal Garnet material is made with medium or heavy weight paper and all cloth backings, and flexibilities in belts, sheets, rolls or discs . . . or in any other standard form.

Why not let us show you how we can cut costs on your sanding operations? There is a Mid-West field representative ready to serve you. Write us for his name.

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# Finishing

Courtesy DeVilbiss Co.

## Conveyors In the Finishing Room

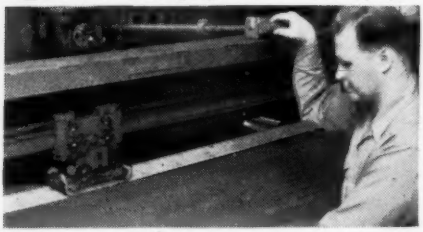
## Furniture Finishing . . . . . Part V

**By Harold B. Gatslick**

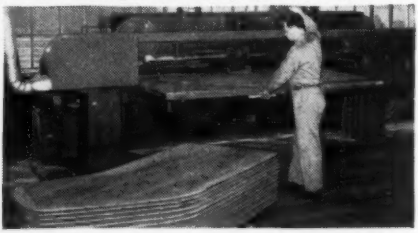
Leading furniture-maker proves it...

# 3M PRODUCTION PAPER BELTS LAST 50% LONGER

1 Standard Furniture Co., makers of quality furniture, were using garnet paper belts on stroke sanders for sanding veneer and hardwood desk tops and panels. Production was slow—averaging 15 to 20 desk tops per belt—and costs per finished piece were high.



2 A 3M Representative suggested that this Herkimer, New York, manufacturer switch to 3M Production Paper Belts for this stroke sanding operation. Production jumped to an average of 25 to 30 desk tops per belt—at a considerable over-all cost saving.



3 Extra-sharp, extra long-lasting 3M Production Paper Belts are made expressly for stroke sanding operations. They cut clean with less pressure, give better finishes faster than any other abrasive belt you can buy. For full details about 3M Production Paper Belts and the complete line of 3M Coated Abrasives, write Minnesota Mining and Mfg. Co., Dept. HD-85, St. Paul 6, Minn. for FREE booklet, "3M System for Sanding and Finishing Wood". Ask about the new 3M Woodworking Movie, "It Goes With the Grain".

3M ABRASIVES

**Remember, the final finish mirrors all previous operations**

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# Conveyors in the FINISHING ROOM

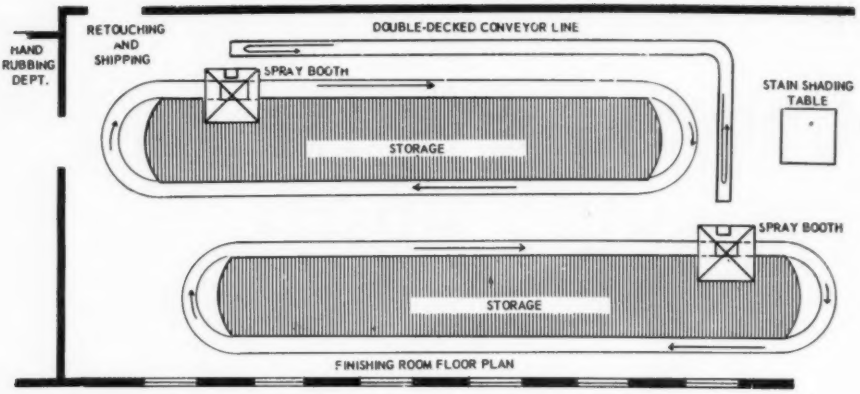
CONVEYORIZED finishing operations have improved production for many wood products manufacturers. In this article we are presenting the report of a Michigan wood furniture manufacturer.

The Townsend Manufacturing Company had set up finishing operations in such a way that a great deal of manual handling was necessary. Trucks of furniture were pulled from one finishing operation to the next. Work space, of course, was crowded because of the trucks and it was difficult to maintain good housekeeping standards. Because skilled workers generally had to move the trucks, their total output was greatly reduced and the company was not using their abilities to the best advantage.

Management thoroughly investigated the possibilities of conveyorized operations and then installed a Rapistan system, manufactured by the Rapids-Standard Co., Grand Rapids, Michigan. The system chosen was a low-cost gravity guided pallet conveyor system. Before long, this new equipment paid off.

## HOW THE SYSTEM WORKS

- Assembled furniture is brought into the finish room, placed on the table for stain shading to bring out the wood grain.
- Spray booth operator removes furniture from table, places it on pallet located over foot-controlled pneumatic hoist which raises or lowers furniture pieces in the precision spraying operations.
- After applying a sealer, the operator starts the palletized furniture on the guided pallet line (one of two). Pallet travels by gravity to rubbing operation.
- After rubbing, pieces flow back to the spray booth for a coating of glaze and move through a repeat rubbing process, returning to spray booth for the third time.
- Operator transfers furniture to the upper level of a double-deck guided pallet line on which the pieces move by gravity to a second spray booth.
- Pieces are removed, the empty pallets are placed on the lower level of the double-deck conveyor line and return to their starting point.
- On second conveyor loop, pieces receive two coats of lacquer and antique in two cycles of the conveyor system.
- Upon completion of the final coats of finish, they are removed from



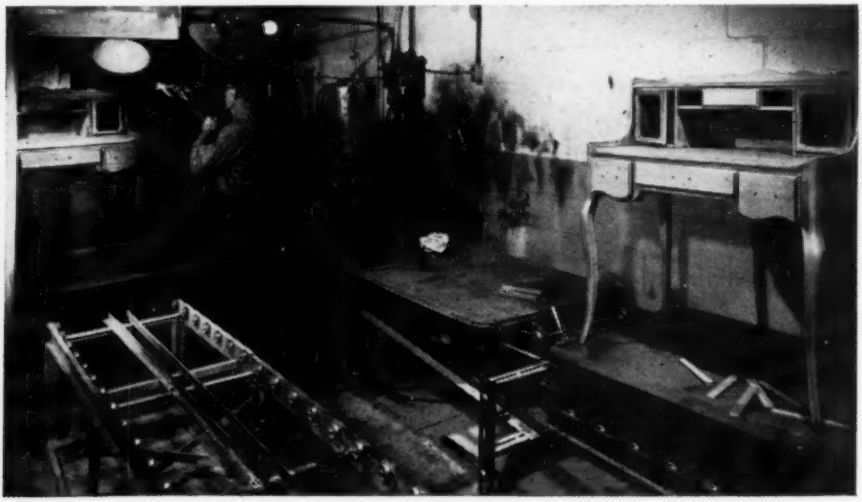

*Finishing room floor plan.*

the conveyor at the hand rubbing department.

Though the company has not released figures showing dollars and cents savings, Mr. Warren R. Townsend, president, says, "The decrease in inventory alone in stock in the finishing room makes it a profitable investment."

Manual handling has been eliminated and thus has improved housekeeping. Better use of craftsmen's time has resulted in production increase and better employee morale.

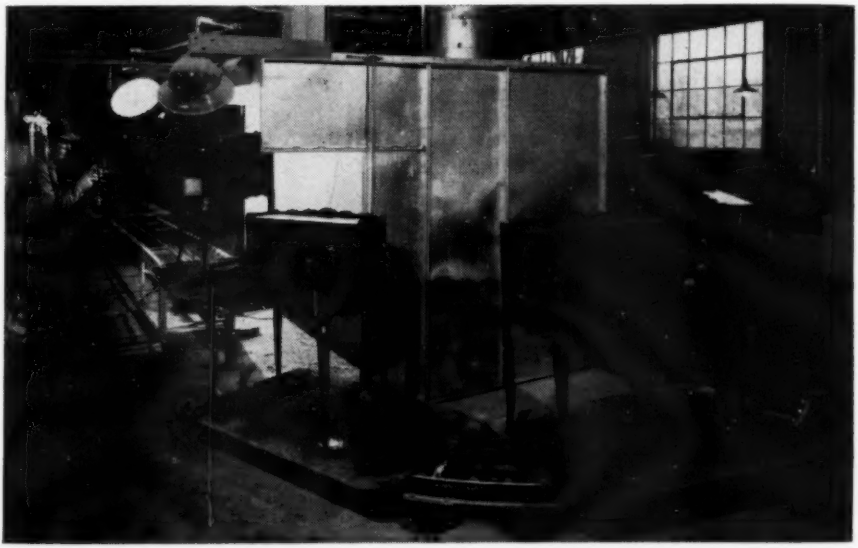
To line up the advantages specifically, would include results such as:



*Spray booth No. 2, showing arrival of furniture pieces via double-deck guided pallet. Foreground conveyor is oval type single-deck guided pallet.*

*Shot of spray booth showing guided pallet line. To left middle is carriage for double-deck guided pallet.*

- Conveyor system has eliminated manual handling and trucks, allowing more room and greater safety.
- Workmanship, inspection and quality are improved, because pieces are handled at levels most convenient for worker.
- Housekeeping is 50% better. Elevation of work above the floor, plus the elimination of hand trucks, keeps area cleaner and less congested.
- Employees like the new equipment. Reduction of lifting and tugging has made it possible for women to do many of the operations.



*General view of spray booth No. 2, showing movement of pieces (right to left). Also shows use of pneumatic lift.*

*Women completing rubbing process as pieces flow to them. Also visible is return flow (light pieces directly behind front row) to spray booth for second coating or transfer to double deck guided pallet system.*

*Woman operator applying stain shading. Spray booth operator is applying coat of sealer.*

*There are a number of manufacturers who will be glad to advise about the use of their conveyors in your operations. Write to WOOD WORKING DIGEST for additional information.*

**No. 18 PNEUMATIC DRUM SANDER**

# EKSTROM, CARLSON

# SANDERS

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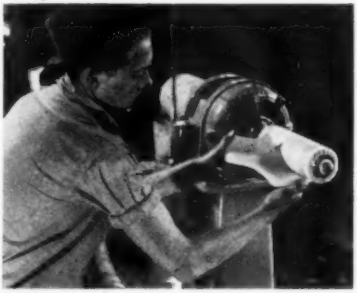
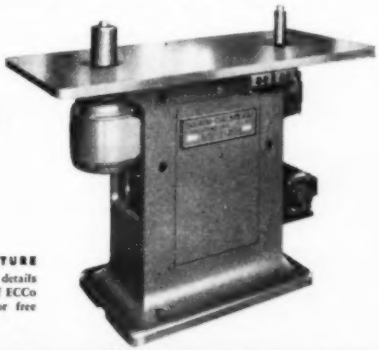


Smooth, fast, economical finishing of irregularly shaped pieces — you can get it with ECCo Sanders! On the No. 18, inflated pneumatic drums provide a cushion that follows the contours with results equal to fine, but slow and laborious, hand sanding. Spindles extend both sides to permit a wide variety of drum set-ups and two-man operations when desirable. On the No. 114, dual oscillating spindles with generous spacing and a large table insure fine finishing of band-sawed pieces and plenty of opportunity for various set-ups and two-man use. ECCo Drums in a wide range of sizes in either pneumatic or plain types are available for equipping these machines to handle a tremendous range of sanding work.

**CONDENSED SPECIFICATIONS**

| | No. 18 | No. 114 |
|---|---|---|
| Motor RPM | 1200 or 1800 also 2-speed | 1800 and 3600 (2 motors) |
| Height | 37½" to spindle | 37" to table |
| Spindle & Extension Diameters | 1¼" and ¾" | ¾" |
| Work Table Size | ——— | 24" x 58" |
| Floor Space | 20" x 38" | 24" x 58" |
| Drums Furnished | 2"x9" & 8"x9" or 3"x9" & 6"x9" | 4"x6" & 2"x6" (Hard Rubber) |



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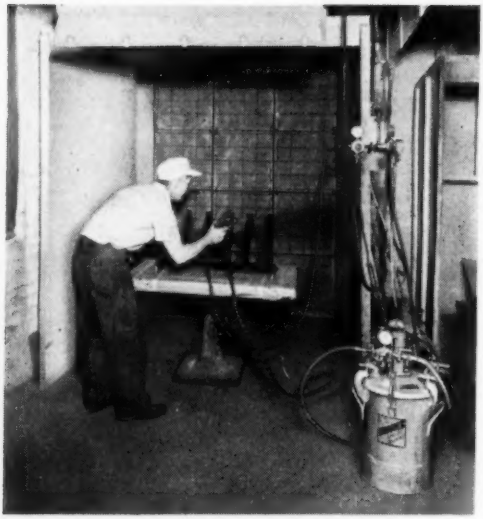

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# FURNITURE FINISHING

## Part 5

By

HAROLD B. GATSLICK

THE preceding parts in this series dealt with the many intricacies of surface preparation. This article outlines the methods and materials for the primary undercoat and topcoat operations in production furniture finishing in the order they will be covered in succeeding articles of this series. A section on bleaching is included at the end of this article.

### STAINING

Staining furniture to produce unique and more desirable finishes is a complex science. Production procedures today are greatly different from the techniques employed by the skilled ancient craftsmen.

Recent and increased technological development in the pigments and dyestuffs fields already have been felt in many product lines. This is particularly true in the automotive, textile and specialty product lines where research and development have demanded and gotten improved product coloring techniques. This was done through increased basic research, synthesis and development of processing and application techniques.

To some extent, the wood furniture industry has realized benefits from the knowledge gained; but no radical attempt has been made to divorce standard effects and produce colored furniture in keeping with the wide variation in colors available in other products. There have been a few scattered attempts toward expanded coloring in wood as well as a marked acceptance of light-colored finishes in modern furniture, and there appears to be no limit to the extent of development possible along these lines.

A stain may be defined as a suspension or solution of coloring matter which is designed primarily to impart surface color effects. The principal reasons for staining would include:

1. Increasing or accentuating the color contrast of highly figured woods.
2. Uniforming the color contrast by reducing the color difference between heartwood and sapwood.
3. Producing color harmony not obtainable with natural-finished woods.
4. Imitating more expensive woods with species having less desirable shades or tones.
5. Producing special effects such as weathered oak, antique pine and cherry.

Wood stains may be separated into four major types. These are: water soluble, oil soluble, spirit soluble and

non-grain-raising. Sometimes classified as primary stains, these stains have as their major volatile component a liquid containing the hydroxyl group. Most modern stains contain synthetic dyes as coloring agents.

## PIGMENTS AND FILLERS

A pigment may be defined as a coloring substance which is insoluble in the liquid in which it is suspended or dispersed. Pigments find wide usage in paints, enamels and pigmented lacquers for both metal and wood finishing; but with the present-day trend toward greater color variation in household furnishings and with the decrease in the availability of traditional furniture woods, the role of pigments in furniture finishing is ever increasing.

The filler is often considered "the foundation of a fine finish." Many of the principal cabinet woods have large pores and these must be properly filled in order to assure the desired final effect. Conifers and diffuse-porous woods are generally finished without the use of fillers, but occasionally these woods are filled to equalize absorption of different surface areas.

Good body or depth of finish is required today on most furniture made for the home. The recent demand for a furniture finish of great depth and high polish on modern-design furniture requires a smooth, mirror-like surface. Open pores or partially filled pores detract greatly from its appearance.

The main function of a filler is to fill the open pores and provide a level surface for the subsequent topcoats. Secondarily, a filler serves to impart color to the pores and thereby emphasize the grain. Fillers are also employed on exposed end grain to prevent absorption of the topcoats.

Wood fillers may be classified into two general types: (1) the paste filler, which is transparent or opaque, used on open-grained woods, and (2) liquid filler which is generally transparent and used for the close-grained woods.

## SEALERS

The final quality of a finish is dependent to no small extent upon the proper development of each succeeding finishing step from the bare wood to the application of the final topcoat. Sealers effectively serve many purposes and may be employed at different times during the finishing operation. The terminology is quite specific depending upon the time of application.

In an over all consideration, the sealer primarily prevents absorption of materials from one coat to another and allows for maximum adhesion by offering a smoother surface for the subsequent coating. The sealer used on bare wood is generally called a

*"Has it ever occurred to you that my work just matches my salary—lousy!"*

**Table I.—HOW DIFFERENT WOODS RESPOND TO BLEACHING[1]**

| BLEACHES WELL | BLEACHES FAIRLY WELL | BLEACHES | WILL NOT BLEACH |
|---|---|---|---|
| American Ash | Japanese Ash (Tamo) | Beech | Blackwood |
| Aspen | Canaletta | Holly | Bubinga |
| Avodire | Imbuya | Koa | Cherry |
| European Beech | Lacewood | East Indian Laurel | Ebony (Macassar) |
| Narra | Makori (African Cherry) | Prima Vera | Gaboon (Black Ebony) |
| Tanguile | Tasmanian Oak (Yuba) | Peroba | Iroko |
| Carpathian Elm | Pearwood | Redwood | Kelobra |
| Myrtle | Lauan | Sycamore | Orientalwood |
| | Mahogany | | African Padouk |
| | Oak | | Vermilion Padouk (Andaman) |
| | Walnut | | Paldea |
| | | | Rosewood |
| | | | Sapeli |
| | | | Satinwood |
| | | | Sissoo |
| | | | Zebrawood |
| | | | Thuya |

[1]By permission from **The Science of Modern Wood Finishing** by G. L. Deniston. 1949. Research Press, Inc.

size; the sealer used between the stain and filler coat a washcoat; whereas the sealer employed following the filling operation may be called a sealer, prime coat, and lacquer or varnish undercoat.

It is generally agreed that glue sizing and washcoating are desirable to obtain an optimum quality finish, whereas the sealer is an absolute necessity for obtaining an acceptable finish. With perhaps fillers being the exception, sealers have proved to be one of the weakest links in the present-day finishing systems.

Sealers may be divided into three broad groups. These are: lacquer sealers, varnish sealers and shellac sealers. The primary function of a sealer is to seal the surface of the wood, thereby preventing absorption of succeeding finish coats.

Other functions include: (1) sealing in the filler, (2) blending or moderating the stain, (3) stiffening minute wood fibers to allow for sanding to a smooth surface for subsequent coats, and (4) allowing a maximum bond between any preceding or succeeding coat.

## VARNISHES

Before developing an introductory discussion of varnish coatings, it would be well to differentiate between lacquers and varnishes as usually understood in the trade.

Lacquer coatings, in general, involve those materials that form a surface film by volatilization of solvents and thinners, whereas varnish coatings involve evaporation of solvents and polymerization reactions.

Varnishes may be divided into three primary types. These are oleoresinous or oil varnishes, synthetic varnishes and spirit varnishes.

Spirit varnishes are solutions of gum or resin in a volatile liquid, with or

## Table 2—Some of the Common Bleaches Used in Production and Shop Work

| Bleaching Chemicals | Recommended Formulation | Technique of Application | Neutralization | Remarks |
|---|---|---|---|---|
| 1. Sodium hydroxide<br>Hydrogen peroxide | 4 lbs. sodium hydroxide in 10 gals. water with 28% or 35% hydrogen peroxide | Apply sodium hydroxide solution. Dry approximately 30 minutes. Then apply even coat of hydrogen peroxide and allow to dry. | Wash with cold water. Then wash or spray with acid, 1 lb. oxalic or 1 lb. acetic acid in 10 gals. water. Allow to stand 15 minutes. Then rinse with water and dry. Sand to remove raised grain. | Two-solution production bleach. Strong and effective. Can be mixed for 1-solution application, but has a short effective life. |
| 2. Sodium hydroxide<br>Silicate of soda<br>Calcium hydroxide<br>Hydrogen peroxide | 11 lbs. flake sodium hydroxide, 10 oz. silicate of soda - 42°Be and 10 oz. calcium hydroxide (hydrated lime) in 10 gals. water with 35% hydrogen peroxide | Apply as in bleach No. 1 or use as a 1-solution bleach. | same | 1- or 2-solution production bleach. Bleach strength better controlled than in No. 1 bleach. |
| 3. Sodium hydroxide<br>Calcium hydroxide<br>Hydrogen peroxide | 12½ lbs. flake sodium hydroxide and 10 oz. calcium hydroxide (hydrated lime) in 10 gals. water with 35% hydrogen peroxide | Apply as in bleach No. 1 or use as a 1-solution bleach. | same | Similar to No. 1 bleach. |
| 4. Sodium hydroxide<br>Silicate of soda<br>Hydrogen peroxide | 10 lbs. flake sodium hydroxide and 8-1/3 lbs. silicate of soda - 42°Be in 10 gals. water with 35% hydrogen peroxide | Apply as in bleach No. 1 or use as a 1-solution bleach. | same | Similar to No. 2 bleach. |
| 5. Sodium hydroxide<br>Epsom salts<br>Hydrogen peroxide | 1 volume containing 20 oz. flake sodium hydroxide in 7 pints of water and 9 oz. epsom salts in 1 pint of water with 2 volumes of 28% hydrogen peroxide | Apply as in bleach No. 1 or use as a 1-solution bleach. Caution: the epsom salt solution should be carefully added to the caustic solution. | same | Similar to other peroxide caustic bleaches but epson salts helps stabilize peroxide in wood with high mineral content, thereby giving greater effectiveness. |

| | | | | |
|---|---|---|---|---|
| 6. Hydrogen peroxide<br>Ammonia | 28% or 35% hydrogen peroxide with aqueous or dry ammonia from cylinders | Apply hydrogen peroxide. Place in fuming chamber exposed to ammonia or flow on ammonia solution. Allow to dry. | No neutralization. Light sanding. | Production method faster with greater economy. Not as strong as bleaches No. 1, through No. 5. |
| 7. Silicate of soda<br>Aqua ammonia<br>Hydrogen peroxide | 2 qts. silicate of soda - 42°Be and 1 qt. aqua ammonia (28-29% ammonia concentrate) in 3 qts. water with 35% hydrogen peroxide | Apply ammonia-silicate mixture. Follow with hydrogen peroxide after desired penetration time. | Neutralize with dilute acetic acid solution. Dry and sand. | Production bleach for woods not difficult to bleach. Less effective than caustic-peroxide bleaches. |
| 8. Oxalic acid | 4 to 32 oz. oxalic acid crystals in one gal. hot water or 1 gal. denatured alcohol. | Apply even coat of desired concentration until desired bleached effect is attained. | Wash with hot water. Neutralize with 3 oz. borax in 1 gal. water and rinse surface with hot water. Dry and sand. | Weak shop bleach. Denatured alcohol reportedly gives greater bleaching action than water. Removes vegetable and casein glue stains. |
| 9. Oxalic acid<br>Sodium hypophosphite | 4 lbs. oxalic acid and 4 lbs. sodium hypophosphite in 1 gal. hot water | Apply even coat until desired bleached effect is attained. | Neutralize with borax solution (4 lb. in 1 gal. water). Rinse with hot water. Dry and sand. | Shop bleach for removal of mineral streaks, dark spots and iron stains in oak. |
| 10. Sodium bisulfite<br>Oxalic acid | 6 oz. sodium bisulfite in 1 gal. water<br>8 oz. oxalic acid in 1 gal. water | Apply sodium bisulfite solution. Allow to dry. Follow with oxalic acid solution and allow to dry. | Wash with hot water. Neutralize oxalic acid with 3 oz. borax in 1 gal. water and rinse surface with hot water. Dry. | Shop bleach for walnut. Not as powerful as sodium hydroxide and hydrogen peroxide. Two-solution system. |
| 11. Sodium hypochlorite (laundry bleach) | 5% sodium hypochlorite diluted ½ pint in 1 gal. water | Apply even coat until desired bleached effect is attained. | Wash surface. Dry and sand. | Specialty bleach for light blue stain discoloration. Not recommended for oak or poplar. |
| 12. Potassium permanganate<br>Sodium bisulfite | 1 oz. potassium permanganate in 1 gal. water<br>3 oz. sodium bisulfite in 1 gal. water | Apply potassium permanganate solution. While still wet, apply bisulfite solution. | Light rinse. Dry and sand. | Specialty bleach for French or Huguenot walnut finish. |

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without the addition of modifying agents. Spirit varnishes are in reality lacquer-type coatings since they do not require oxidation or polymerization, but harden by the evaporation of their volatile solvents.

Clear oil varnishes contain drying oil, resin, driers, solvents and thinners. The drying oils may be of animal or vegetable origin and consist of mixtures of triglyceryl esters of fatty acids. The drying of an oil is primarily a polymerization (curing) process involving gelation (hardening).

Those oils with the greatest conjugation (reactive power), are the fastest drying and give the densest molecular structure. But they discolor during drying to a greater extent than the less highly conjugated oils. Therefore, in clear varnishes drying speed often must be sacrificed to reduce yellowing tendencies.

## LACQUERS

The word "lacquer" was derived from the word "lac" relating to the excretion of lac insects which, on processing, is called shellac and came to be a descriptive term for thin-bodied, hard, clear, colorless finishing materials. Modern industrial usage now has limited the term lacquer almost exclusively to coating materials containing nitrocellulose, ethyl cellulose, cellulose acetate, benzyl cellulose and other film-forming chemicals incorporated with natural and synthetic resins and plasticizers in volatile solvents.

The use of nitrocellulose lacquers for furniture topcoats was one of the most important factors leading to streamlined production furniture manufacture. The primary advantages exhibited by nitrocellulose lacquers were the fast drying effected by evaporation and the

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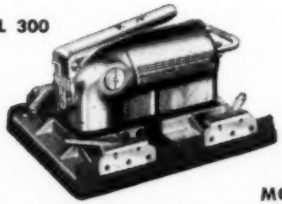

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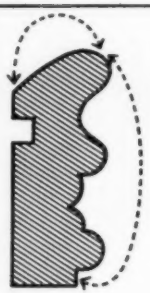

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formation of uniform films with good physical and chemical properties. These latter properties could be adjusted for specific production requirements and the manufacture and control could be approached on an almost purely technical basis due to the nature of the ingredients.

The primary disadvantages of lacquers were the low solids content and the relatively high cost. A partial answer to the cost and solids content drawbacks has been the development of the so-called hot spray process whereby spraying viscosity is controlled by temperature and greater build can be obtained with fewer coats than with conventional cold lacquers. Developments in hot lacquer spraying will be discussed in detail later.

Lacquers have shown marked volume increases in use by the furniture industry in the past 30 years and have been the leading topcoat material for the past decade.

## BLEACHING

Wood is bleached for several reasons, including: production of a uniform

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white or light surface, to remove unsightly stains, to remove glue and other chemical stain, and to reduce the color differential between heartwood and sapwood or crotches and swirls to match surrounding wood.

Today, with the importance of light finishes such as amber, sandstone, suntan, harvest, wheat, heather, tweed, pickled and blond finishes, bleaching is widely employed. It might be well to mention that the use of toners to affect light finishes has been and is gaining increased importance since bleaching can be a bottleneck in production finishing. However, since toners, may hide the wood grain, most quality production of light finishes requires a bleaching technique. Some woods are more difficult to bleach than others. Deniston classifies the

bleachability of different woods as shown in Table 1.

Bleaching is normally accomplished by the use of aqueous bleaching solutions. Some of the most common bleaches used today in production and shop work are shown in Table 2.

The strength of the solutions and the precise technique of application varies considerably. Woods vary to such an extent in color and physical and chemical composition that trial-and-error effort is often the best answer in developing a production bleaching technique within any individual plant.

## BLEACHING APPLICATION METHODS

Bleaches may be applied by spraying, brushing or dipping. Since bleaches are strong oxidizing agents, certain precautions must be taken. Workers should be equipped with protective clothing and rubber gloves and adequately instructed in handling the material.

If bleaching is done by brush, nylon or fiber brushes are recommended. Some finishers swab on the solutions with cheesecloth or cotton waste. In spraying a separate spray booth and a corrosion-resistant spray gun are recommended. Rubber hoses and aluminum equipment normally cannot be successfully used. Glass jars and equipment coated to resist acid and alkali solutions should be employed.

Since bleaching solutions are aqueous, grain raising is always effected to some extent. Before drying and final sanding, it is most important that the surface be neutralized and any reaction products removed. When alkaline bleaches are used, a simple test to assure that complete neutralization


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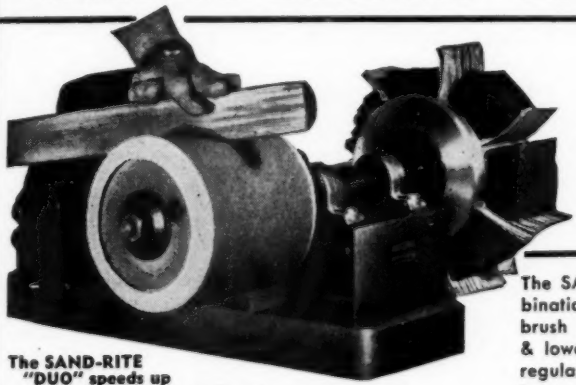

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has taken place is to place several drops of a mixture of one part of phenolphthalein, 50 parts of ethyl alcohol and 50 parts of water on the surface in question. If the spots turn red or pink, even for only a minute or two, the wood is alkaline and should be further neutralized.

The bleached and neutralized piece should be allowed to dry until it has again equalized at the moisture content desired for processing. Air drying normally takes from 24 to 48 hours, but will vary with the amount of moisture added and the drying conditions in the shop. Forced drying can be effected in four hours or less, but the surface moisture content should be checked by means of a moisture meter.

After drying, raised grain should be removed by the use of 4/0 or 5/0 cabinet abrasive paper and the dust removed with compressed air and by brushing with a stiff-bristled brush and using a tack rag.

## PROBLEMS IN BLEACHING

All processes employed today are rather critical and each plant has to adopt a bleaching technique which will give the least difficulty with the materials available.

Some of the more important problems encountered in wood bleaching are:

1. Grain raising, which is effected by the use of aqueous solutions.
2. Long production time, which is caused by bleaching steps and drying time required.
3. The need for washcoating to eliminate discoloration caused by bleeding of filler oils.
4. Non-uniform staining caused by


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bleach residues and/or non-uniform bleach penetration.

5. Variation in surface bleach effects caused by lack of temperature control and/or the use of old bleaching materials.

6. A lack of light stability as a result of inadequate depth of bleach penetration or the use of bleaches that yield poor light stability.

7. Improper neutralization which may cause failure of the subsequent finish.

8. Blistering or pinholing caused by improper drying.

9. Variation in bleached effect and subsequent oxidation caused by variation in moisture content of the stock.

10. Lack of care in mixing and/or application of bleaching chemicals resulting in variation in the bleached effect and/or improper neutralization and drying.

Of course, temperature and moisture content control are extremely important in bleaching operations, and production-wise plant layout and control systems can minimize problems in bleaching.

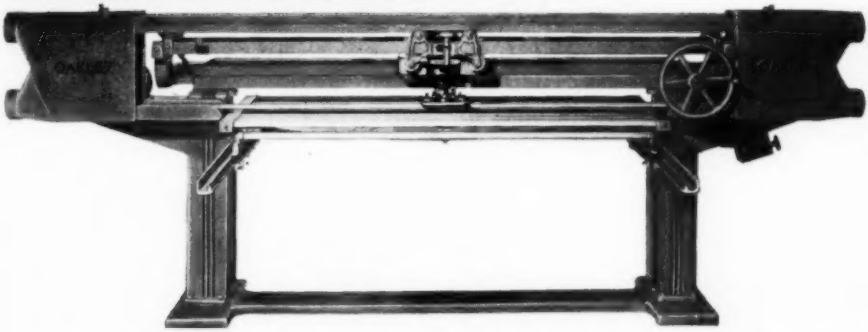
**The next article in this series will give a detailed description of types of stains available, their advantages, disadvantages and application methods.**

A fashionable lady and her dog approached the voting booth.

"Ah," said a bystander, "I see you are going to exercise your franchise."

"This isn't a franchise," retorted the lady. "It's a cocker spaniel."


**The OAKLEY Model D SINGLE BELT SANDER**



Here's an Oakley which can be best described as a high production, streamlined sander which is high in speed, semi-automatic, reversible, dust proof. Sanding capacity 6' 8" or 8' 8". This is just one of the many Oakley Sanders used throughout the woodworking industry.

*Send today for information on this and other Oakley Sanders. You'll find the answers to your sanding problems. No obligation.*

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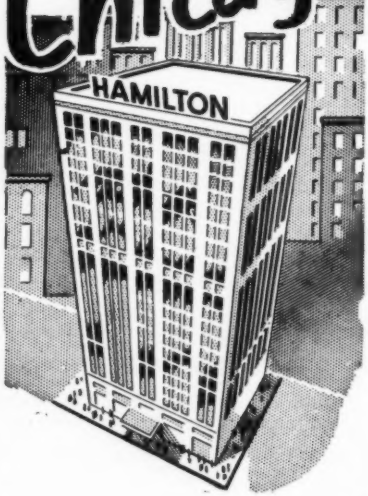


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# SAWMILL FEATURES GM POWERAMA

A sawmill operating full blast within sight of big city skyscrapers will be one of Detroit Diesel Engine Division's major attractions at General Motors' Powerama, which opens in Chicago August 31. The event is to be a spectacular exposition of power arranged to celebrate General Motors' over all production of 100 million Diesel horsepower.

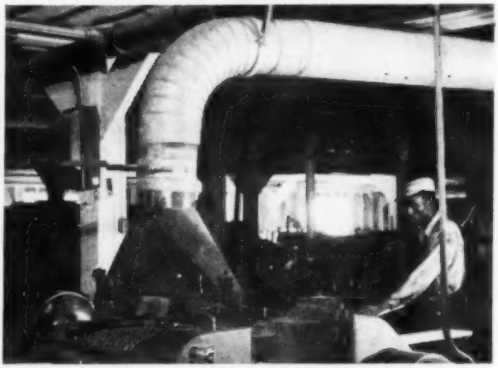
The Powerama will be located on a 23-acre site on Chicago's waterfront adjacent to Soldier Field. It will be open to the public without charge daily from 10:00 a.m. to 11:00 p.m. August 31 through September 25.

Featured will be many exhibits of Diesel-powered equipment in actual operation. These will show how some of this vast horsepower has been put to work and give the American public a true conception of the part GM Diesel power has today come to play in our industrial economy. All exhibits will have wide public interest and the sawmill will focus considerable attention on the lumbering industry.

Timber will be trucked in daily from midwest logging centers and sawed into lumber before the eyes of thousands of Powerama visitors. Many of these visitors will be getting the smell of fresh sawdust in their nostrils for the first time.


# CONTROL REFUSE AND DUST FROM SOURCE TO DISPOSAL-

**MATTHEWS ENGINEERING KNOWHOW CAN SOLVE YOUR DUST PROBLEMS!**



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# Loads Truck In One Hour

*Crates of veneer on roller conveyor. Note that conveyor is then mounted on casters.*

A new method being used by Chester B. Stem, Inc., New Albany, Indiana, has cut loading time in shipping veneer. Usually it is possible to load a truck in an hour with this method.

Factory loads are placed on roller conveyors and these conveyors supported by casters. The company secures the pile of veneer crates on the roller conveyors by two loops of rope at the front. This keeps the crates from rolling off as they are pushed into the truck trailer. When they are in position, the loops are disengaged from the front of the bottom crates and then the entire pile of crates is given a forward push, causing them to roll off the front end of the roller conveyor and slide down onto the floor of the trailer.

In this way the entire pile is loaded at one time and in a very short time. The few top crates are then loaded with a power truck loader, which is a portable boom similar to a derrick boom which rolls right into the truck from an overhead power hoist.

---

**STAIN CONTROL CHEMICAL**

A new two-pound package of "Lignasan" fungicide, blue stain control chemical for lumber, has been announced by the Du Pont Company, Wilmington, Del. The new package makes it easier to prepare the recommended concentration for lumber treatment. It also reduces exposure to the chemical since no scooping or weighing is necessary. Two pounds of chemical is the right amount for 100 gallons of solution to treat 8,000 to 10,000 board feet.

The manufacturer recommends preparing a pre-mix in a drum beside the vat, and piping it into the vat solution as needed.

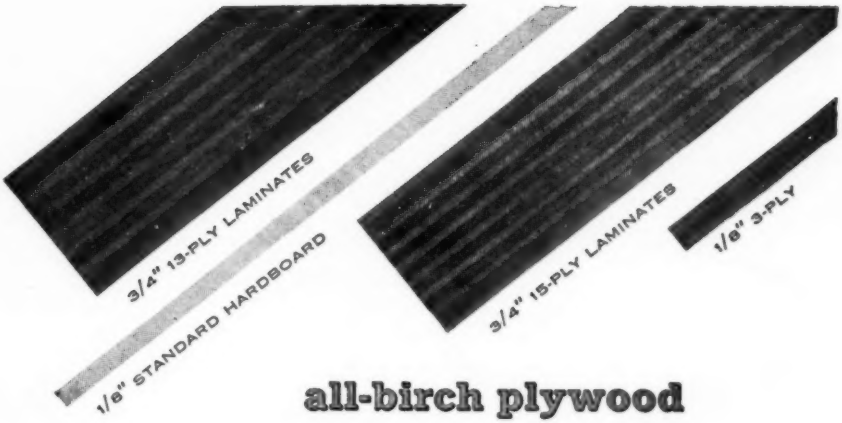
"Lignasan" has been used by the lumber industry since 1930, for control of the fungi which cause sap stain or blue stain. It is based on ethyl mercury phosphate, and is suitable for use on both hardwoods and softwoods.

**NEW GLUE**

Development of a new fortified liquid urea resin adhesive for use in room temperature gluing operations on exterior doors, outdoor furniture, plywood and other protected exterior applications, has been announced by the Chemical Division of the Borden Company, 350 Madison Ave., New York City. The new product is designated Casco-Resin 190.

CR-190 will produce a quality bond when used in cold press, intermediate temperature and radio frequency gluing processes. It is mold-proof, stain-free, light in color and highly water-resistant. In addition, the glue will withstand a three-hour boil test. It shows excellent heat resistance and, even when extended with flour, produces a bond in edge-glued stock which will not break down under steam bending.

Available now in commercial quantities, CR-190 may be stored up to six months at 70 degree F.

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### ONE PIECE COUNTERTOP

A simple 10-page instruction booklet released by Consoweld Corporation, Wisconsin Rapids, Wis., shows step-by-step how to install Curvatop, the new pre-formed countertop plastic surfacing, easily and at a low cost. The manual is complete with numerous illustrations.

In just a few easy steps employing ordinary tools, Curvatop can be installed on kitchen counters, and bathroom vanities. It is available in standard countertop dimensions: 96″ long, and 25½″ wide with 4¾″ backsplash and in ten attractive patterns and colors. This counter unit can be installed using Consoweld Edge Trim (self-edging plastic) or the company's Twin-Trim pattern and color matched mouldings. Special adhesives are available for use in applications.

### ALLIS MOTORS

Motor stocking has been greatly simplified with the new L. A. line of electric explosion-proof motors, according to a recent announcement by the Louis Allis Co., Milwaukee 7, Wis. Underwriters' approval has been received for these units for use in all Class I, Group D, and Class II, Groups E, F, and G hazardous locations. Every new L. A. line explosion-proof motor carries a label indicating approval for use in all four of these hazardous locations.

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A lift truck system, consisting of a patented lift jack and engaging bracket, in conjunction with semi-live platforms, is offered by the Hamilton Caster & Mfg. Co., Hamilton, Ohio, makers of industrial casters, wheels and floor trucks.

The Hamilton lift truck system provides low cost, flexible handling in any type of warehousing or storage operation. It is especially valuable in applications where the use of palletizing and power trucks is not practical or possible. When not in use, the lift jacks may be conveniently stored in an upright position and the skid trucks can be easily stacked.

## TECO FACILITIES

Men with ideas for new or improved wood products, finishing processes, or wood treating materials, which they would like to prove feasible before putting them on the market, will find much of the "know-how" in a colorful new publication just issued by Timber Engineering Company, research affiliate of the National Lumber Manufacturers Association.

Copies of the publication, "Teco Testing Facilities," are available without charge from Timber Engineering Company, 1319 - 18th Street, N.W., Washington 6, D.C.

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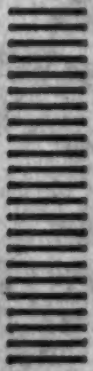

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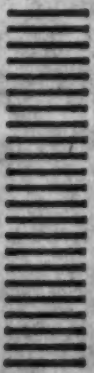

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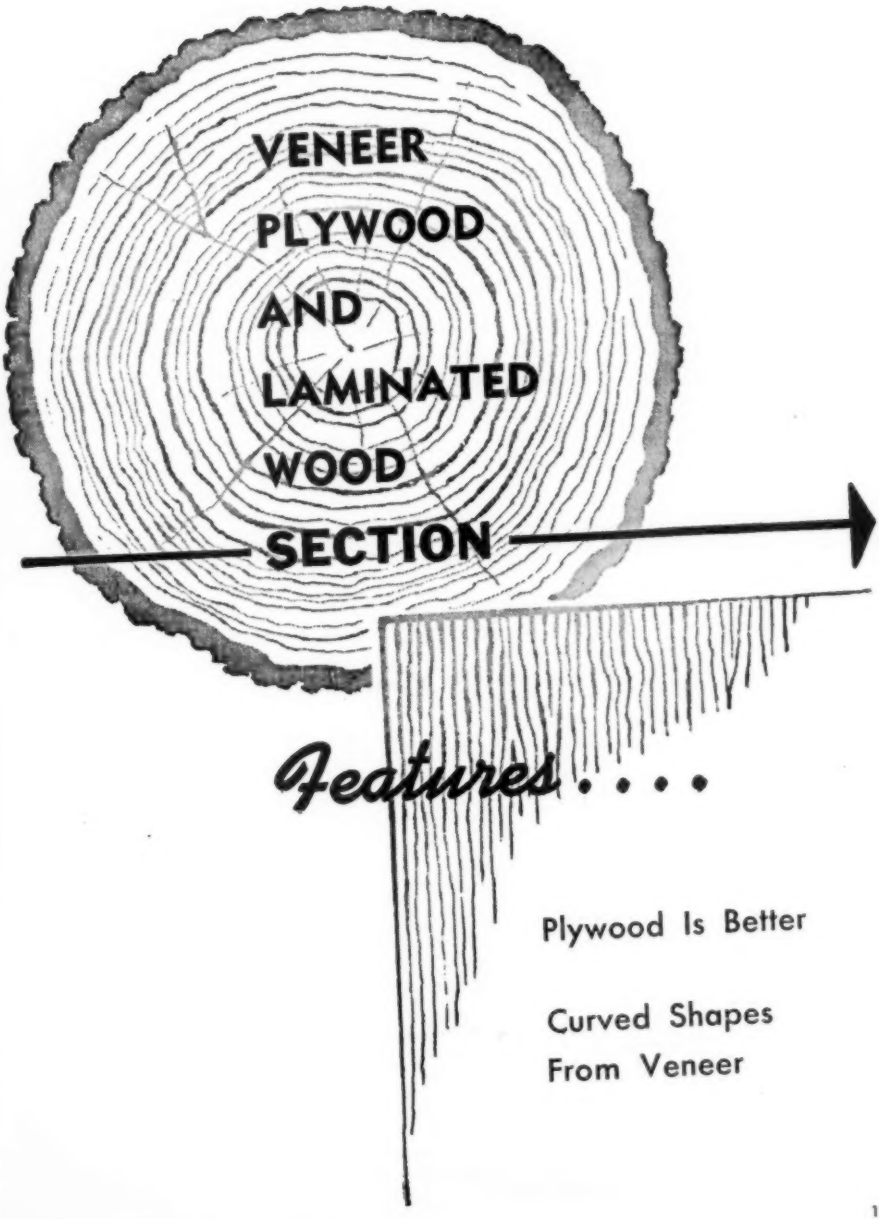
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# Curved Shapes From Veneer

By
Bruce Heebink

CURVED products of light plywood and laminated wood can be produced by simultaneously gluing and forming strips or sheets of veneer to the desired shape. Plywood seats, angles, and tubing; laminated ribs for small boats; and numerous boat and aircraft parts, such as plywood hatch covers, laminated fuselage rings, wing-tip bows, and molded plywood shells, are only a few of the many uses to which the process of gluing veneer to curved shapes is adapted.

The basic principles of gluing practices that are essential to the gluing of flat laminated or plywood products are equally applicable to the gluing of curved members. Information relative to general gluing practices is available in other publications prepared at the Forest Products Laboratory.[1,2]

The purpose of this report is to present a brief summary of some of the methods used in gluing laminated or plywood members of single curvature, and to illustrate these methods by means of sketches. Since the application of adequate and uniform gluing pressure is the principal special problem involved in the gluing of curved shapes, suitable methods for applying pressure to members with various degrees of curvature are presented. These methods merely illustrate correct principles. It is not intended here to provide detailed instructions relative to the application or to the numerous possible variations of each method.

## FORMING MEMBERS OF SLIGHT TO MODERATE CURVATURE

If the curvature is only slight or moderate (laminations or plies bent through an angle of less than about 120°), the easiest way to apply gluing pressure is by means of a pair of solid forms (Fig. 1, A and B). When loaded, such forms can be laid in screw or hydraulic presses and pressure applied just as in gluing flat stock. If many small curved items of the same design are to be made, it may be convenient to prepare a series of nested forms and use them superimposed upon each other in a press.

Whether heat should be employed

[1]U. S. Dept. Agr. Bul. 1500, "The Gluing of Wood," 1929.
[2]Forest Products Laboratory Report No. 1340, "Control of Conditions in Gluing," 1941.

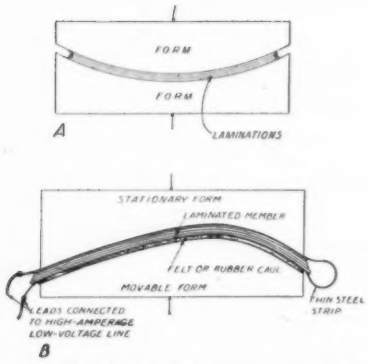


***Fig. 1. Methods for gluing members of slight to moderate curvature. A, Gluing with forms only. B, Gluing with forms and an electric strip heater.***

to cure the glue depends upon the curing characteristics of the particular glue used and, in some cases, upon the economy of quick removal from the forms. Some glues require the application of heat for the full development of strength and durability. Others cure by cold pressing at ordinary room temperature, although their rate of setting may be accelerated by the application of heat, and the pressure period consequently shortened.

The curing of curved members in forms (Fig. 1, A) may be accomplished by heating to the desired temperature in a humidity-controlled chamber. Under properly selected and controlled conditions this method of heating avoids dimensional changes due to the drying of wood during the curing period.

The use of electric strip heaters to accelerate the setting of some glues on relatively thin members is illustrated in Figure 1, B. A piece of thin, high-carbon steel 0.005 to 0.010 inch thick is attached to the inside surfaces of both forms. A sheet of felt or heat-resistant rubber on one form may be used to compensate for slight inaccuracies in the fit of parts. The strip heater must be uniform in cross section to facilitate uniform heating. The electrical energy necessary to produce the desired temperature in the strip heater will depend on several variables, such as size, shape, and construction of forms, but a power consumption of about 1½ watts per square inch of heater strip has been found to be generally applicable. The use of less than 30 volts is advisable for the safety of the operators. Power can be supplied by a step-down transformer in series with a variable voltage transformer or by a welding machine. The

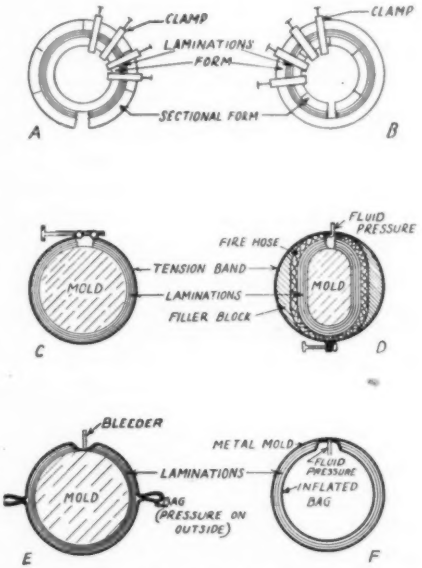


***Fig. 2. Methods for gluing members of considerable curvature. A, Gluing with hand clamp pressure (form on inside). B, Gluing with hand clamp pressure (form on outside). C, Gluing with tension band pressure. D, Gluing with tension band and fluid pressure. E, Bag gluing (bag deflated). F, Gluing (bag inflated).***

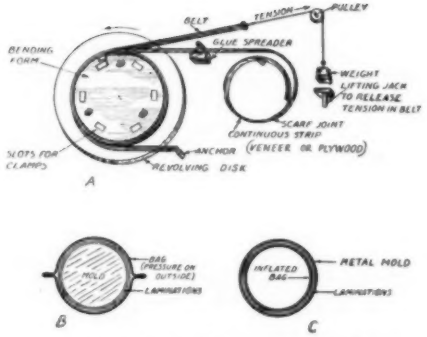


***Fig. 3. Methods for gluing complete rings or cylinders. A, Gluing with winding and tension band pressure. B, Bag gluing (bag deflated). C, Bag gluing (bag inflated).***

jig is loaded and pressure applied before the power is turned on.

## FORMING MEMBERS OF CONSIDERABLE CURVATURE

Members having considerable curvature (laminations or plies bent through more than about 120° but less than 360°) are normally made by the methods shown in Figure 2. Figures 2, A and 2, B show the use of clamps to provide pressure on rigid mating forms. Figure 2, A shows the sectional form on the outside, and 2, B shows the sections on the inside of the assembly. In either method the clamping should start at the midpoint of the member and progress toward the ends.

A male form provided with a metal tension band as illustrated in Figure 2, C may be used provided the curvature is approximately circular. Since the pressure is inversely proportional to the radius of curvature, it will be high at points of small radius and low at points of large radius in elliptical or slightly oval shaped members. On a flat portion of an otherwise curved member, the pressure from a tension band would be zero. Assuming that the width of the work corresponds to that of the strap, the radial gluing pressure on circular shapes in pounds per square inch is equal to the tension per inch of width of the strap (in pounds) divided by the radius of the circle (in inches).

If the member deviates slightly from a circular shape in places, it is difficult to use tension bands alone, because the pressure may then be too low on the straighter portions. One method of meeting this difficulty is to use a fire hose under the tension band. The hose is closed at one end and connected to an air or water pressure supply at the other. In this method the laminations are spread with glue and laid in place, and the tension band is tightened. Air or water under pressure is then admitted into the hose. If the shape deviates greatly from a circular shape or if there are straight portions, it may be necessary to interpose filler blocks between the hose and the tension band as shown in Figure 2, D, since the band tends to assume a circular shape with fluid pressure in the hose. It is apparent that the setting of resin glues could be accelerated if hot water or steam were used in the hose.

In methods 2, E and 2, F the pressure is applied through a rubber bag by a fluid, such as air, steam, or water. Figure 2, E shows the use of a male form or mold, around which the material is wrapped. The whole assembly is then enclosed in a loose-fitting bag and subjected to pressure. The bag and its contents should be placed in a pressure tank or autoclave to provide both adequate pressure and heat to set the glue. This method is commonly known as "bag molding."

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In 2, F the material is inserted inside of a metal form and, after ends have been attached and sealed, the pressure is applied by means of inflating a rubber bag. The form may be steam, electrically, or electrostatically heated, or the bag may be inflated with steam or hot water to cure the glue. If elevated temperature is required, the glue may be cured in methods 2, A and 2, B by strip heaters, as illustrated in Figure 1, B or by heating in a chamber.

## FORMING COMPLETE RINGS OR CYLINDERS

When the laminated or plywood member is a complete ring or cylinder, the manufacturing difficulties are considerably increased. One method consists in using a continuous lamination wound spirally around a form with the gluing pressure applied by tension of the lamination alone or aided by belt pressure. This method is illustrated in figure 3, A on a closed member of circular shape. Application of this method requires that the laminations first be spliced end to end by means of glued scarf joints until a sufficient length is provided to form the complete ring. It would be possible in some cases to manufacture much the same product by laminating the rings in half sections and later joining pairs of half sections with glued scarf joints. Any heating required to cure the glue may be accomplished by placing the assembly in a heated chamber.

The use of fluid pressure to form completely closed rings or cylinders is shown in methods 3, B and 3, C. These methods are identical to 2, E and 2, F except that the laminations are either continuous or have the joints in individual laminations staggered. Suc-

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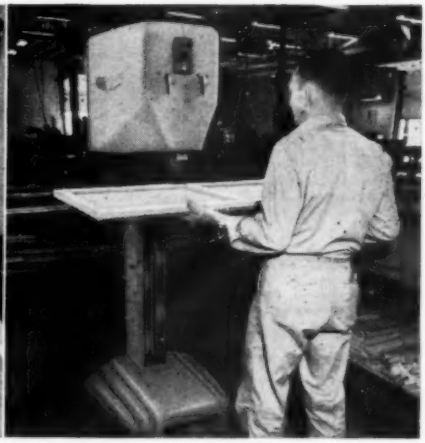

As soon as Amendment No. 1 to Federal Specification PPP-B-601 was published, Temco of Dallas, one of America's leading aircraft companies started making *all* their cleated plywood shipping boxes on their Auto-Nailer. They make 24 different sizes—using panels from 12 x 12 to 24 x 48 inches, changing from one to another in seconds. Auto-Nailer makes, drives and clinches 3 nails per second, so turns work out much faster.

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cessful use of either method 3, B or 3, C depends upon careful fitting and placing of the first lamination in intimate contact with the form and drawing succeeding laminations together into position. Any looseness will result in defective glue joints.

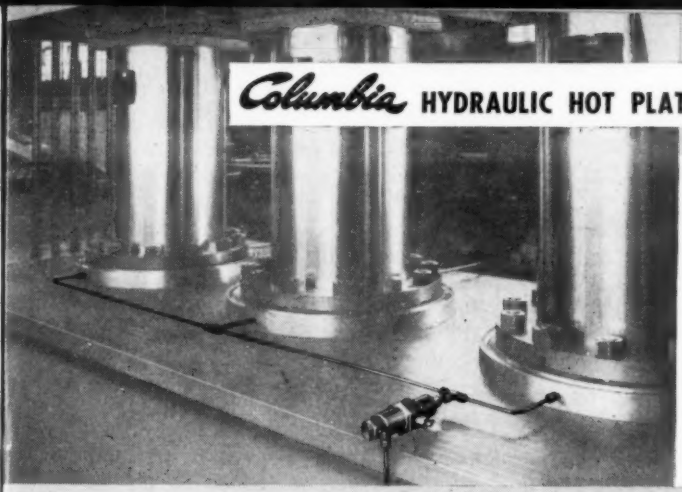
This material is from Report No. R1485, published by the Forest Products Laboratory, Madison 5, Wisconsin.

# Early All-Plywood House Still In Use

What happened to the 15 glamorous houses which formed the "Town of Tomorrow" exhibit at the 1939-40 World's Fair in New York City? At least one of them, the all-plywood structure which was House No. 2 in the exhibit, still fulfills its intended role. It has actually been used as a home since the end of the Fair. What's more, it stands as solid and attractive as in its World's Fair days despite 16 years' exposure to the elements. It bolsters strongly the plywood durability claims made by the Douglas Fir Plywood Association, which this year is marking its 50th anniversary.

Inspected by millions who had visited the World's Fair in Flushing Meadows, the house made entirely of Douglas Fir Plywood today stands on the Pittstown, N.J. farm of William F. Leicester, retired Borden Company vice-president who was in charge of chemical operations. Mr. Leicester spent 35 of his working years in developing and supplying Borden Chemical Division adhesives to the plywood industry.

When the World's Fair ended in 1940, Mr. Leicester purchased the all-plywood house and had it dismantled, panel by panel, for reconstruction on



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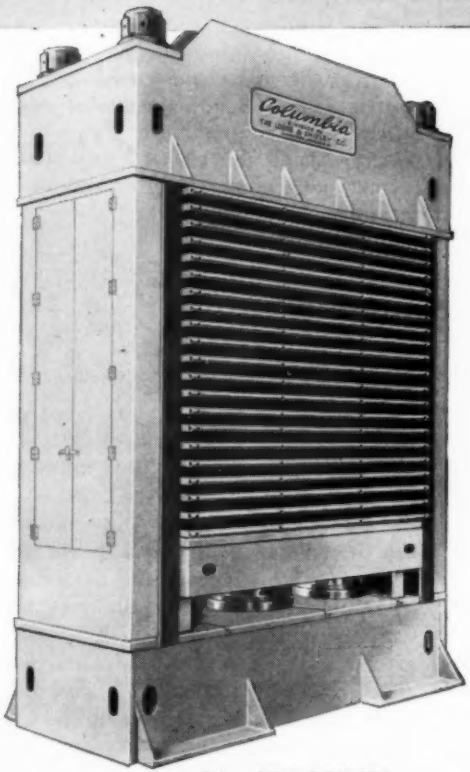


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his 145-acre dairy farm in New Jersey. It today is the home of his farm manager's family of three. Its appearance is but slightly altered, more practical windows replacing sliding glass doors which originally had led to a screened porch. The arrangement of the six rooms in the house is the same as in the World's Fair days although some of the room interiors have been covered with wall paper and others painted.

At the time of its showing at the World's Fair, the house of plywood represented one of the then newest building materials. The "Architectural Forum" of July 1939 said of it:

"This home successfully accomplishes its purpose to bring to the public's attention the many and varied uses of one of Home Building's newest materials. It is covered with plywood—inside, outside and on top. And with the exception of sheathing on the roof, most of the plywood is finished natural."

The World's Fair plywood house, hailed at the time as of striking modern design was the work of Architect A. Lawrence Kocher. The cost of the house was listed at $4,500. Built of Douglas Fir Plywood manufactured in 1937-38, it was one of the earliest all-plywood houses made in this country. Its survival of weather extremes in the New Jersey area and continuous use over the past 16 years is a high tribute to the strength and durability of Douglas Fir Plywood. Showing no warping, the plywood interiors and exteriors are as smooth and attractive as ever. And standing on a concrete block, the house continues to be an ideal year-round home.

## HPI Meeting

The emphasis was on quality control and trade promotion at the summer meeting of the Hardwood Plywood Institute in Atlanta, during June.

New qualification rules for the HPI label were approved by the membership. Promotional plans for furniture manufacturers and dealers and retail lumber and hardware dealers were disclosed.

The main feature of the qualification rules is an even higher performance average than the 10-cycle soak and dry test for Type II plywood previously in effect. To assure highest quality, HPI mills must begin an accelerated testing and quality control inspection program when a mill's performance falls below 80 per cent of 15 cycles.

Other provisions require a regular procedure of submitting samples to the HPI testing laboratory in Atlanta and the use of grade charts in each plant. These charts, showing what veneers and characteristics belong in each grade, are placed in assembly and inspection locations in the plants.

Following the quality control discussion, all in attendance visited the HPI laboratory where laboratory chief John Butler and inspector Earl Biggs described the testing operations. The visitors saw expanded facilities for the Type II test, the laboratory's new viscosity meter and hot press, and new equipment for checking the effect of humidity and heat.

Richard D. Behm, HPI trade promotion director, described three promotional plans for lumber dealers. The first—the idea, of promoting wall paneling to match flush doors—has become a "permanent" theme, because of its success and importance.

Behm said two other plans are being developed. The first involves the compilation of a "do-it-yourself" plans and idea bibliography to be placed in retail stores. The plan ideas will feature the use of hardwood plywood as a home workshop material.


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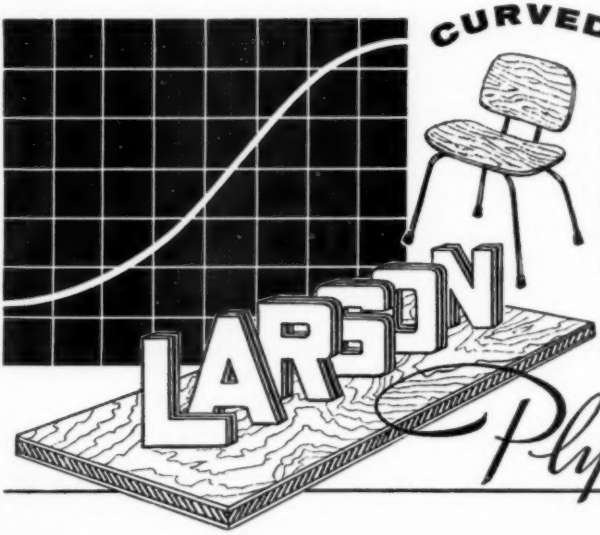


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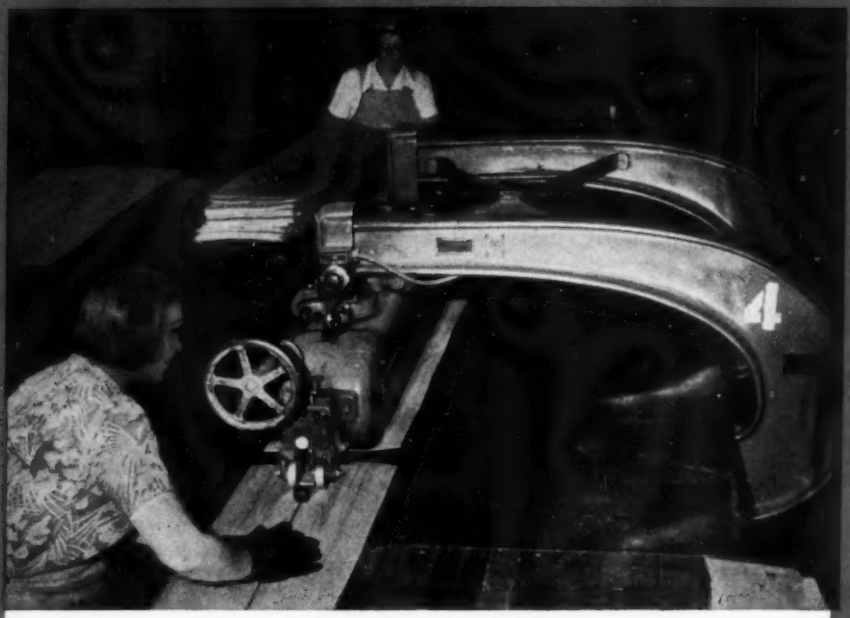

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# PLYWOOD *Is Better....* Metal Layers

By **Thomas D. Perry**

METAL coverings on wood have found many uses in the past, where a fire resistant layer of a high density face was required. Any method of attaching metal layers to solid wood presented many difficulties, since the tendency of the solid wood to shrink and swell developed numerous awkward problems of checking, buckling and warping.

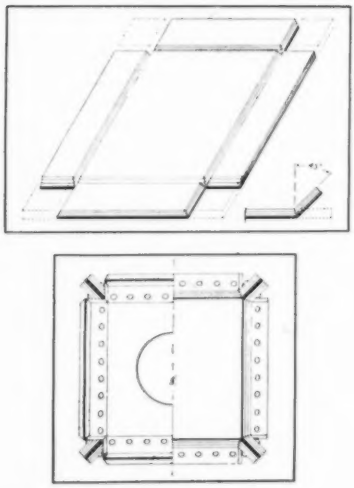
On the other hand plywood made of crossed veneer layers, with its negligible dimensional change under varying moisture conditions, has provided a welcome solution in this situation, since it supplies a sturdy backing of unvarying dimensions. It has proved to be an adequate answer to many otherwise unsolvable problems. These plywood and metal combinations are manufactured and sold under several designations, among them, ply-metal, met-l-wood, metal clad plywood, armorply, and the like. They are largely interchangeable. Usually the metal layers are on the outside of the plywood, although in the case of decorative paneling, the metal may be an inner layer. The more important of these metal plywood combinations will be described briefly, indicating the extent to which plywood adds to the effectiveness of such metal layers as may be required. The function of the plywood, in general, is to supplement the stiffness of the metal layer, and often to supply a decorative face veneer reinforced with a metal backing or interlayer.

## WOOD TO METAL ADHESIVES

Ordinary wood adhesives will not successfully produce a strong bond between metal and wood, since the glue cannot penetrate into the metal as it does into the wood. Obviously a "one-way" adhesive is of questionable value. Therefore the problem demands a special type of adhesive, which is usually a blend of casein and some form of latex. It can be hardened in a matter of hours at room temperature, although the pressing time requirements can be substantially shortened by hot pressing. Another important feature is that the metal surfaces must be entirely free from oil and grease. A special sheet steel, called "Galvaneel" is readily available and gives strong bonds. In other metals it is necessary to thoroughly cleanse the surfaces by washing, abrading, acid immersion, or some other equally effective treatment. Some of the metals, such as lead and copper, are difficult to glue to wood under any conditions.

## DIMENSIONING PLY-METALS

In most cases ply-metal is glued up after metal layers are cut to final net sizes. After gluing, the ragged ply-



Courtesy U. S. Plywood Corp.
*Fig. 1. Ply-metal powder case.*

wood edges are trimmed down to the size of the metal.

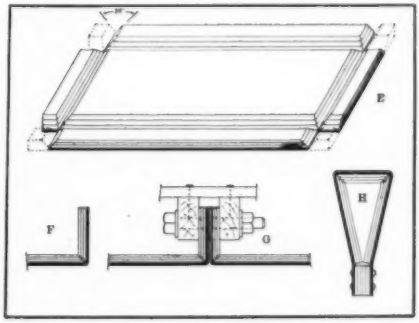
However, special saws for ply-metals are available, approximating the teeth and temper of hack saw blades. These will satisfactorily cut the combination products. Metal burrs on the rough edges of the metal layers should be removed promptly after cutting, to avoid the hazards of personal injuries to workmen.

The type of saw will depend on the metal in use, with aluminum the easiest to cut, and stainless steel the most difficult. Advice should be sought from competent manufacturers of saw blades.

## PLY-METAL POWDER CASES

This powder carrying and storage case, extensively used by the United States Army, has an all metal interior, the sides being stiffened by plywood exteriors. The six flat sides (ply-metal) of this cubical container are grooved with a 45° cut-out down to the metal, to provide for a 45° fold, as is indicated in Fig. 1. The superfluous corner blocks are removed, so that all four wings can be bent, leaving metal on the convex side of each of the six sheets. An important step in making this flat ply-metal unit is planing the surface of the pre-glued plywood, on which the metal is to be glued. It must be planed to a high degree of smoothness, as well as to a uniform thickness. The planer knives must be sharp to make a clean cut. Sanding is not satisfactory, since it tends to cut more deeply where the wood areas are soft, as in the spring wood growth. A clean scraper cut is equivalent to the planer cut if a scraper is available. Attempts to glue the metal and veneer layers in one operation have seldom been found satisfactory.

After bending, the angling wings are bolted together. Any final welding of the joints for tightness, can be done through the large metal rimmed opening in the top of the case. This type of bolted corner construction can also be used for other types of containers.




Courtesy U. S. Plywood Corp.
*Fig. 2. Ply-metal structures. E. Plywood backing, slotted 90° for folding edges. F. Corner bend completed, to a right angle. G. Bolting edges of wall panels to studding. H. Method of making joists of the same type of ply-metal.*

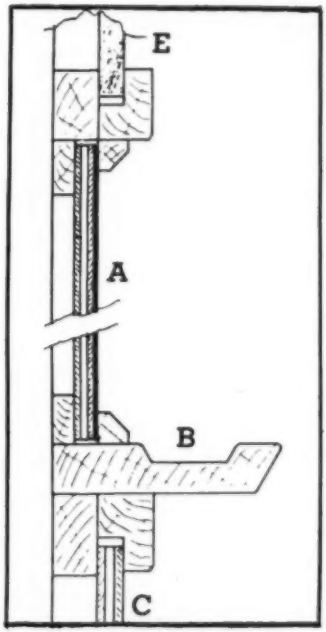
## PREFABRICATED INDUSTRIAL BUILDINGS

A similar method of folding edges, from which the plywood backing has been cut away, is also employed for prefabricated buildings, and some of the more important details are indicated in Fig. 2 and described in the captions. While "Galvaneel" (an electrolitic coated sheet steel) is used in this type of ply-metal it is important that the faces of the bolted joints be painted as they are assembled, and that all exposed surfaces be kept well painted, or coated with preservatives, to prevent rusting.

Armorply, as offered by the United States Plywood Corporation may be had in plain or decorative metal patterns (roll embossed) for many types of custom built structures. This assortment of designs is helpful where the metal requires an attractive exposure, and needs the stiffening backing of plywood. Armorply is available in galvanized steel, stainless steel and aluminum.

## SCHOOL BLACKBOARDS

This term, blackboard, is used in the generic sense, since in this connection it is more correctly described as chalk-board. A dark green color has been found to be preferable for the writing surface. This color is easier on the eyes, is less sombre tc look at, and is fully as effective in displaying chalk marks. Metal clad plywood offers several advantages over the conventional slate blackboards, since it is available in larger units thereby reducing the number of surface joints, and it has no tendency to chip at the edges, nor to fracture under the severe usage that is characteristic of the average schoolroom. Such chalk-




Courtesy U. S. Plywood Corp.

***Fig. 3. Metal clad chalkboard, vertical section. A. Metal faced plywood, the writing surface. B. Chalk tray of wood molding (may be metal). C. Wainscoating of normal plywood, ¼" 3-ply. E. Low density tacking board, for mounting pictures.***

boards usually have a 3-ply, ¼" plywood backing with a .015" aluminum face, which can be installed as is shown in Fig. 3. While wooden chalk troughs and molding strips are shown, alternates are available in bent extruded metal mouldings. The panels above the chalkboards are usually of a fibrous material, such as Masonite or Celotex, for tacking up display material.

An interesting feature of this metal clad chalkboard is that hooks or hangers for maps and large pictures may be of the magnetic type, easily located anywhere on the metallic sur-

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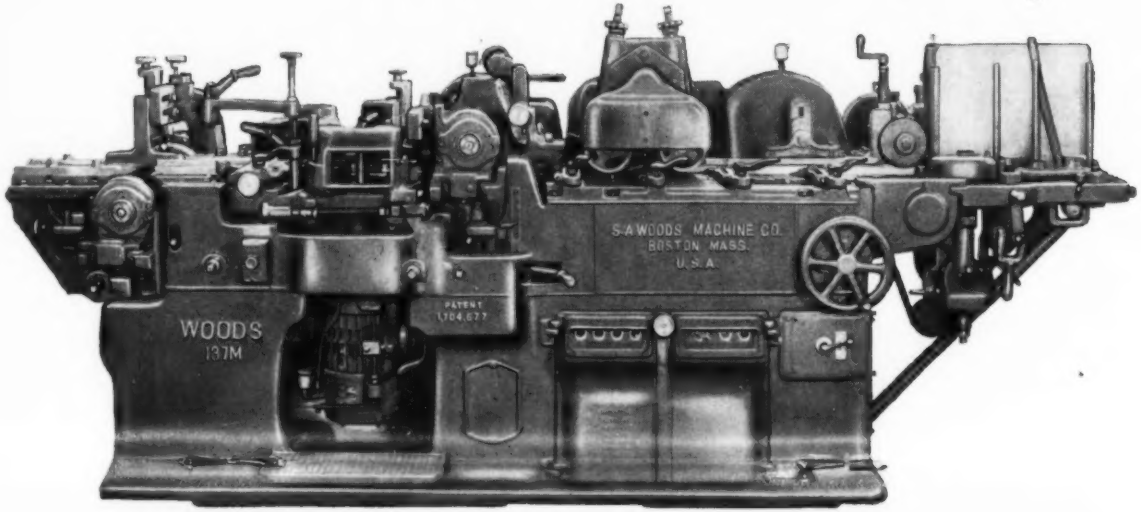

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*Fig. 4. Corrugated plywood, aluminum clad.*

face, and without causing any damage to the writing surface.

While this metal clad chalkboard is available in lengths up to 12 feet, vertical flush joints can be made with edge grooves and splines, or normal square joints can be caulked.

## CORRUGATED METAL CLAD ROOFING

An indicated type of corrugated roofing has been developed by the Industrias Maderit of Sao Paulo, Brazil, which is proving to be both economical and efficient for structural purposes in that country. This metal clad plywood is made with corrugations about 2″ high and 6″ on centers. This plywood is ¼″ to 5/16″ thick, 5-, 7-, or 9-ply. The cross layers, bent against the grain, must be thin, 1/30″ to 1/40″, in order to take the curves without rupturing. This plywood is overlaid, on both surfaces, with a moderately thick aluminum foil, which is glued to the plywood as it is made. A phenolic resin adhesive, in film form (Tego) is used, and gives a good bond with the aluminum, which has

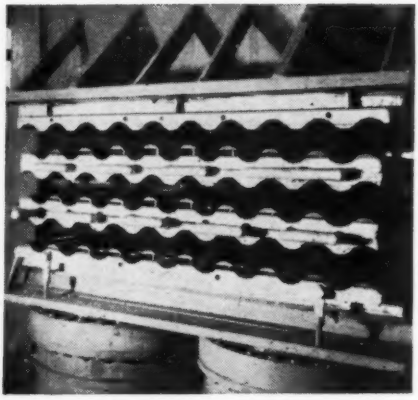

*Fig. 5. End view of corrugating hot press, open.*

been pretreated for the removal of any oily substances. A stack of such corrugated plywood is shown in Fig. 4, 8 feet long by 4 feet wide.

Such plywood, with two or three intermediate supports, and laid with an overlap against the weather, has been in service for several years, and has been demonstrated to make an excellent and durable roofing for small workmen's cottages, as well as for factory roofs and walls.

Its manufacture requires a special type of hot press, in which the corrugation grooves on the underside of each platen are solid, while the ridges on the top side of the platen are mounted on calibrated coil springs, as is indicated in Fig. 5. In the operating cycle, the center ridges, on the upper side of the platen, stand the highest. These springs are stiff enough to nearly complete these two central corrugations before there is much curving in the two adjacent corrugations on either side of the center. The next corrugations are then pressed in progressively until the edge of the plywood sheet is reached. This progres-

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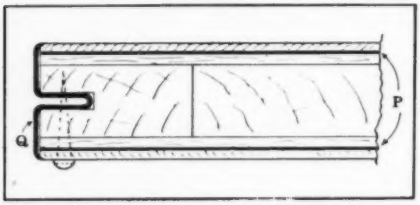


*Fig. 6. Burn proof desk top, cross section. (Heavy black lines indicate metal.) P. Aluminum foil interlay. Q. Inserted metal edging.*

sive curving of the corrugations is necessary, to allow for the "take-up" in width, which amounts to some 5″ or 6″. When attempts are made to press all corrugations simultaneously, there is not enough slippage to allow the formation of the corrugations without serious rupture in the wood, which will be stretched beyond the breaking point. Obviously such corrugating presses require ample "daylights" to permit inserting the assembled layers of veneer, aluminum and adhesive, in the clear space between the upper and lower series of ridges. The ductility and rustless qualities of aluminum make it the ideal metal covering for such corrugated roofing.

## BURN PROOF DESK TOPS

One of the annoying features with a plywood desk top is the possibility of damage caused by careless smokers, who thoughtlessly lay lighted cigarettes where they drop on the desk top. After a thorough study of this problem, the Timber Engineering Company developed an interesting method of providing thin aluminum interlays between the face veneer and the cross banding, as is illustrated in Fig. 6.

These aluminum foil layers are precoated with a special adhesive, which has a rather limited storage life. The plywood, including the pre-glued aluminum layers, are assembled in the usual way, and the whole glued together in one operation, using a hot pressed resin adhesive. The aluminum layers are so thin that they do not seriously dull the trimming saws, but they are thick enough to dissipate any concentrated surface heat, as from a cigarette stub, without danger of injuring the finish on the face veneer, which should be not over 1/28″ thick.

The edges of such desk tops are usually provided with metallic bands, bent and inserted in an edge groove as shown in the sketch.

While this process was primarily developed for desk tops, it is also widely used for tops on bureaus, commodes, bars, radio and television cabinets and the like, where careless smokers may cause unsightly disfigurement.

## FIRE RESISTANT PARTITIONS

Easily erected and more or less portable partitions are a necessity in many office buildings, within restricted areas, where a high degree of fire resistance is mandatory. Plywood with a central layer of metal will meet most of these conditions, and still permit an attractive wood finish on one or both sides, consistent with standard interior trim and office equipment. One of several methods of erecting such metal layered plywood is shown in Fig. 7. Extra metal pro-

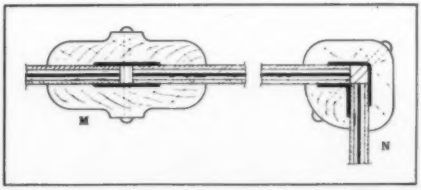


*Fig. 7. Plywood partitions with metal interlayers. (Heavy black lines indicate metal.)*

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**Table 1. STIFFNESS FACTORS for PLYMETAL***

| SHEET STEEL Without Plywood | | | | | Plymetal Thickness Inches | .021" STEEL, 1 SIDE ON PLYWOOD | | | .021" STEEL, 2 SIDES ON PLYWOOD | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Thickness | | | Lbs. Sq. Ft. | E x I | | Lbs. Sq. Ft. | E x I ⊥ | E x I ∥ | Lbs. Sq. Ft. | E x I ⊥ | E x I ∥ |
| Dec. | Ga. | Frac. | | | | | | | | | |
| .036" | 20 | | 1.50 | .12 | | | | | | | |
| .060 | 16 | | 2.50 | .56 | | | | | | | |
| .105 | 12 | | 4.37 | 3.1 | | | | | | | |
| .135 | 10 | | 5.62 | 6.5 | | | | | | | |
| .164 | 8 | | 6.87 | 12. | | | | | | | |
| .194 | 6 | | 8.12 | 20. | | | | | | | |
| .250 | 3 | 1/4" | 10.2 | 39. | 1/4" | 1.46 | 1.9 | 3.2 | 2.25 | 17. | 17. |
| .313 | 0 | 5/16 | 12.7 | 76. | 5/16" | 1.62 | 3.8 | 6.2 | 2.40 | 27. | 28. |
| .375 | | 3/8 | 15.3 | 140. | 3/8 | 1.77 | 5.4 | 12. | 2.56 | 40. | 43. |
| .438 | | 7/16 | 17.8 | 210. | 7/16 | 1.96 | 11. | 18. | 2.75 | 55. | 62. |
| .500 | | 1/2 | 20.4 | 310. | 1/2 | 2.10 | 17.6 | 22. | 2.89 | 74. | 80. |
| .625 | | | | | 5/8 | 2.42 | 29. | 43. | 3.20 | 122. | 130. |
| .750 | | | | | 3/4 | 2.75 | 48. | 72. | 3.48 | 182. | 192. |
| .875 | | | | | 7/8 | 3.05 | 81. | 110. | 3.87 | 255. | 269. |
| 1.000 | | | | | 1 | 3.40 | 122. | 150. | 4.21 | 343. | 359. |
| **SHEET ALUMINUM Without Plywood** | | | | | **Plymetal Thickness Inches** | **.015" Aluminum, 1 Side on Plywood** | | | **.015" Aluminum, 2 Sides on Plywood** | | |
| Thickness | | | Lbs. Sq. Ft. | E x I | | Lbs. Sq. Ft. | E x I ⊥ | E x I ∥ | Lbs. Sq. Ft. | E x I ⊥ | E x I ∥ |
| Dec. | Ga. | Frac. | | | | | | | | | |
| .047" | 16 | | .71 | 11 | | | | | | | |
| .078 | 12 | | 1.14 | .42 | | | | | | | |
| .102 | 10 | | 1.44 | .87 | | | | | | | |
| .125 | 8 | | 1.81 | 1.8 | | | | | | | |
| .156 | 6 | | 2.89 | 3.6 | | | | | | | |
| .250 | | 1/4" | 3.52 | 14. | 1/4" | .84 | 1.2 | 2.3 | 1.01 | 4.3 | 4.9 |
| .313 | | 5/16 | 4.41 | 26. | 5/16 | 1.00 | 2.3 | 4.5 | 1.17 | 7.0 | 8.2 |
| .375 | | 3/8 | 5.29 | 43. | 3/8 | 1.15 | 3.2 | 7.7 | 1.43 | 10.1 | 13.2 |
| .438 | | 7/16 | 6.17 | 69. | 7/16 | 1.34 | 5.6 | 12. | 1.52 | 14. | 19. |
| .500 | | 1/2 | 7.06 | 110. | 1/2 | 1.48 | 9.4 | 16. | 1.65 | 20. | 26. |
| .625 | | 5/8 | 8.82 | 200. | 5/8 | 1.80 | 17. | 28. | 1.98 | 35. | 43. |
| .750 | | 3/4 | 10.58 | 360. | 3/4 | 2.13 | 29. | 46. | 2.25 | 55. | 65. |
| .875 | | | | | 7/8 | 2.46 | 48. | 68. | 2.63 | 81. | 94. |
| 1.000 | | | | | 1 | 2.78 | 72. | 94. | 2.98 | 114. | 129. |

⊥ = With Transverse Grain Face (Crosswise) Next To The Metal.
∥ = With Logitudinal Grain Face (Lengthwise) Next To The Metal.
E x I = Modulus of Elasticity X Moment of Inertia = Stiffness Factor.

* Table Derived from Semi-Logarithmic Chart Developed by Haskelite Manufacturing Corporation, and Used by Permission.

tective strips are provided for corners and joints, as indicated in the sketch. Minor modifications may be required if such partitions are against masonry walls.

## PLY-METAL IN CONVEYOR SYSTEMS

There are many applications in the conveyor industries, in which plywood demands a hard dense face for severe wear, which with a stiff backing will carry substantial loads. Some of these items are chutes, bins, moving pallets, etc. Other allied uses are shipping table tops, scale platforms, ramps, guide boards at turns in the conveyor line, not to mention other less conspicuous applications.

## ELEVATOR CARS AND WELLS

Elevator wells and cars require special consideration, both to protect freight and passengers, as well as to prevent the spread of fire, through what may become a dangerous fire

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flue. In the case of freight elevators, the cars may be lined with metal clad plywood having its metal surface exposed. The reverse is true of passenger cars, where a pleasing and consistent wood interior is desirable, provided that the essential metal protective layer is built into the center or on the back side of the plywood.

The enclosures for elevator wells must, first of all, be highly fire resistant. Passageways to freight elevators usually require plywood walls with metal exposures to withstand heavy traffic.

On the other hand, corridors to passenger elevators are likely to demand attractive wood exposures with the metal protective layer out of sight.

Metal clad plywood, or metal interlayers in plywood, for such elevator applications, may be of several designs, in each of which the metal supplies the fire barrier, and the plywood adds the stiffness needed, not to mention the attractive finishes, if and when such are essential.

## FIRE DOORS AND TRAILER TRUCKS

The conventional fire door, with tin clad covering and soldered joints, left much to be desired, both for appearance and safety. Such sliding doors, released by fusible links, can now be made of ply-metal in more sightly designs and with equal effectiveness. A still further advance is a hinged door, of the flush plywood type, with metal interlayers or coverings, hung in a metal door frame, and controlled by a similar fusible linkage. Such doors can be designed to match attractive wood interiors, with no sacrifice of safety factors.

The trailer truck industry is a large user of ply-metal in various forms and designs. Some of the types of utilization are cabs, trailer linings, floors, tail gates, pallets, loading ramps and the like. Ply-metal has unusual stiffness for its weight, a great advantage in truck design, in addition to a sturdy abrasion resistant surface.

This is one of the largest users of metal clad plywood, and its use in this industry has extended over more than 20 years. This is a conclusive demonstration of the useful characteristics of the ply-metals under extremely difficult service conditions.

## ROBERTSON BONDED METAL

This is a rather unusual approach to making ply-metals, in which a layer of cloth is attached to sheet metal with a low temperature solder. This solder is quickly quenched before the cloth


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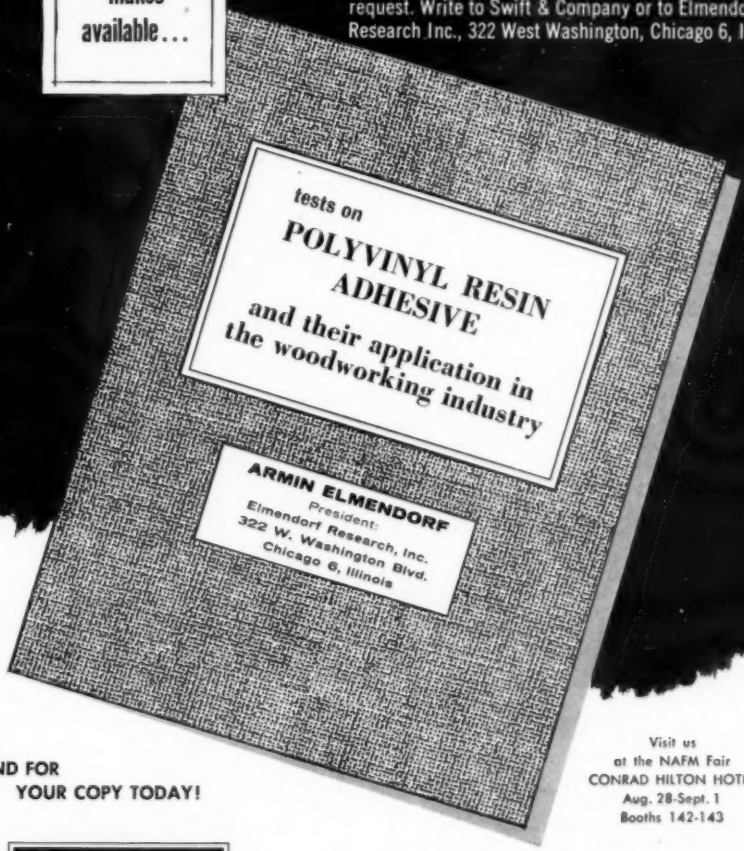


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layer is weakened. Thereafter, wood or plywood can be glued to the cloth side of the metal, using conventional glues or adhesives, with or without hot pressing. When single ply veneer is glued to such cloth covered metal, the combination can be readily bent or curved for column enclosures, or for re-entrant or protruding rounded corners, or to connect floor and wall.

## CONCLUSIONS

Ply-metal of various types is not an easy product to manufacture, and few plywood makers are interested in it. It adds considerably to the cost of normal plywood. That, in spite of these handicaps, its use has grown over the years would seem to be clear evidence of its many advantages where the metal layer contributes substantially to the inherent qualities of plywood.

• • •

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• • •

**F.P.R.S. MEETINGS**

Inland Empire Section, August 4-5, 1955, Butte, Mont.

Northeast Section, October 20-21, 1955, New York City, N.Y. (Prince George Hotel)

Mid-South Section, November 7-8, 1955, Memphis, Tenn. (Peabody Hotel)

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1956 National Meeting, June 4-7, 1956, Asheville, N. C.

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# New Literature

### LUMBER WRAP

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The "controlled pattern" reinforced, machine creped asphalt laminated paper, says the Wisconsin firm, offers many advantages. Among these advantages are: elimination of expensive buildings, simplified stock control and greater mobility.

The brochure also contains information showing that this new method of storage helps to eliminate or prevent bowing or crooking in stored lumber.

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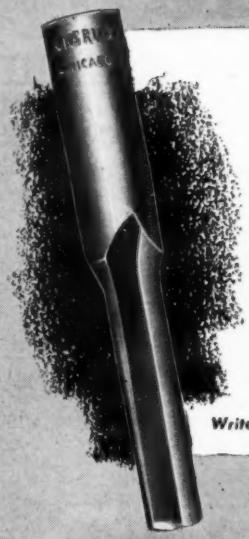

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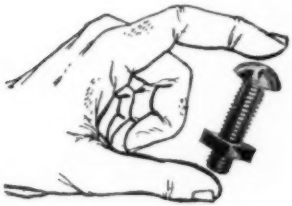

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WOOD SCREWS • STOVE BOLTS • MACHINE SCREWS • A & B TAPPING SCREWS • ROLL THREAD CARRIAGE BOLTS • HANGER BOLTS

Write for free samples and stock list. Box 1360-D

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STATESVILLE, N.C.

WAREHOUSES: New York, Chicago, Dallas, Los Angeles

Loading Guide" by writing Signode Steel Strapping Company, Dept. WD, 2600 N. Western Ave., Chicago 47, Ill.

## PRESSURE-TREATED LUMBER

Uses in light and heavy construction of lumber pressure-treated with Wolman salts are detailed in non-technical language in a new 16-page illustrated booklet released by the Wolman Preservative Department of Koppers Company, Inc., Pittsburgh 19, Pa.

A breakdown is presented, also, of the widely varied fields in which this type of treated lumber may be used most effectively, as well as the specific advantages of its application in each of the construction areas.

## SPECIALIZED ABRASIVES

The story of specialized abrasives and their contributions to the growth of the furniture industry is told in a new book, "Brand of the Tartan."

NEW! STIX
FOR CEMENTING
No. 555
STIX WATERPROOF CEMENT
ADHESIVE
ADHESIVE
QUICK DRYING
ADHESIVE PRODUCTS
CONSOWELD
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LAMINEER
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PARAPLEX
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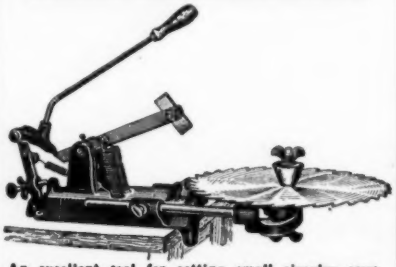
...THE ONLY CEMENT WITH THE LONGTIME SHELF LIFE GUARANTEE
NEW STIX Does Not Thicken With Age. STIX Needs No Clamps, Presses or Heat.
ADHESIVE PRODUCTS CORP.
1660 BOONE AVE NEW YORK 60, N.Y.

SIMPLEX
CIRCULAR SAW SETTING MACHINE



An excellent tool for setting small circular saws. The successful operation of all circular saws depends largely upon the manner in which they are fitted.

To obtain the best results the teeth should be properly and evenly set.

This machine does the work perfectly, insuring easy and true running and smooth cutting.

The hammer strikes every blow with equal force and at the same angle hence the set of each tooth is absolutely uniform. Will give a light, medium or heavy set.

Adjustable for saws, either rip or cut-off, from 5" to 24" in diameter.

The machine will last for years if handled with ordinary care and intelligence.

Further details upon request

ZEILLER & NAGEL, INC.
232 JAVA ST. BROOKLYN, 22, N.Y.

This 250-page volume by Virginia Huck traces the history of 53-year-old Minnesota Mining and Manufacturing Co., developers of special abrasives, industrial adhesives and many other products. It is published by Appleton-Century-Crofts, Inc. at $3.50.

Behind the development of special abrasives are the same qualities—imaginative research, venturesome capital, and progressive management—that have made the company a classic example of free enterprise in action, the book says. It calls these characteristics the key to its evolution from a small mining concern to a large, diversified manufacturing enterprise.

## ADVANTAGES OF HARDWOODS

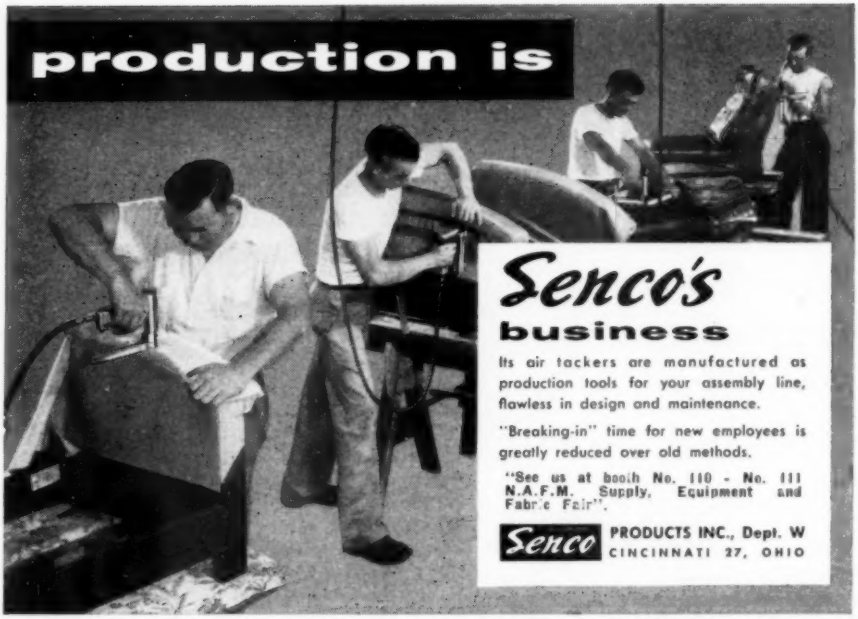
To assist manufacturers of quality hardwcod furniture, pianos, TV and hi-fi sets in every price range, the Fine Hardwoods Association has published a 16-page booklet explaining the lifelong advantages of genuine hardwood furniture in simple words that the homemaker will readily understand.

Offered in national advertising and in newspaper publicity stories, the booklet is in heavy demand proving the high consumer interest in fine furniture woods.

The sound reasons for bonded (plywood) furniture construction in terms of strength, beauty, design variety and price are clearly explained in the booklet. The explanation completely dispels the false idea that "veneered" means a paper-thin sheet of wood merely "pasted" on the surface of a furniture piece, as with imitation grains.

The booklet also includes tips on the easy care of genuine wood furniture; discusses the acoustical qualities of genuine hardwoods for television and hi-fi cabinets, and comments on the timelessness of fine woods and their natural ability to blend within a room setting, often providing a link between different furniture styles or finishes.

Manufacturers wishing to obtain copies of this new **"Know Your Hardwoods"** booklet as a "refresher course"




**Senco's business**

Its air tackers are manufactured as production tools for your assembly line, flawless in design and maintenance.

"Breaking-in" time for new employees is greatly reduced over old methods.

"See us at booth No. 110 - No. 111 N.A.F.M. Supply, Equipment and Fabrice Fair".

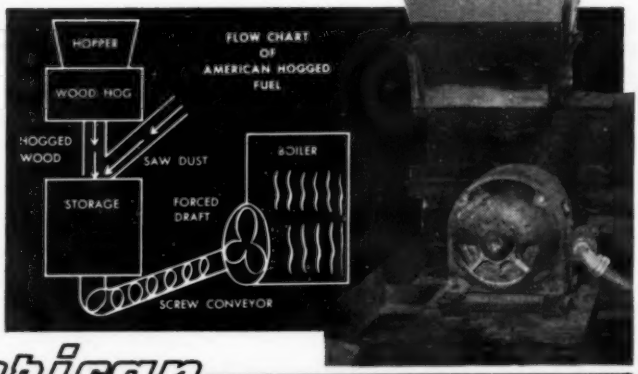
Senco PRODUCTS INC., Dept. W
CINCINNATI 27, OHIO

# AMERICAN WOOD HOG

## Saves 10 Carloads of Coal Per Yr. for N. Carolina Furniture Factory

Burning slabs of wood waste for fuel meant poor combustion, heavy smoke, the annual purchase of 10 carloads of coal for this factory. Today an American Wood Hog converts the wood scrap into boiler fuel for easier handling, storage, and feeding. The results: excellent combustion, little smoke, and *no coal* has been burned since installation...a saving of 10 carloads of coal per year!

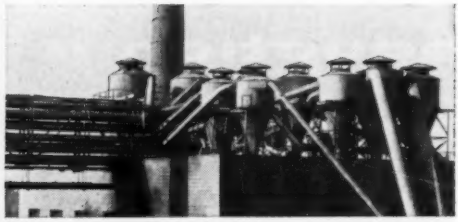
***WRITE for AMERICAN WOOD HOG Bulletin***

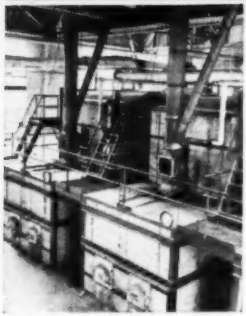



American PULVERIZER COMPANY

1510 MACKLIND AVE. • ST. LOUIS 10, MO.

Free Fuel WITH AN OBP BLOW PIPE SYSTEM





Bottom photo shows discharge piping to boilers. Top photo shows cyclone type units used to collect and distribute material.

A large woodworking plant in Ohio uses a custom engineered OBP pneumatic system to convey their chips, shavings and dust to the furnaces for additional fuel. Not only is this extra fuel free, but the efficient OBP system keeps the entire plant continuously and automatically free of dust, chips and refuse.

This plant has more working area, better working conditions and greater production. They have clean air to breathe, reduced fire hazards, and have eliminated the cost and clutter of boxes, trucks and manpower necessary for manual scrap removal.

An OBP engineer is at your disposal! Call him today! Systems are surprisingly low in initial cost, are virtually maintenance-free, and can actually pay for themselves in a short time.

We handle the complete job —
ENGINEERING—MANUFACTURING—INSTALLING

OHIO BLOW PIPE CO.

1717 Doan Avenue • Cleveland 15, Ohio • MU. 1-7379


for their salesmen should write the Fine Hardwoods Association, 666 Lake Shore Drive, Chicago 11, Illinois, specifying quantities needed.

## SAFETY GUIDE

The National Safety Council's 1955 Occupational Safety Services Guide provides company safety directors with a complete catalog of the many and varied accident prevention aids available from the Council.

In the service guide, company safety men will find not only the tools they need to build their plant safety programs, but also the training aids available for instructing supervisors and workers.

A full line of posters, films and booklets are available to sell safety to the man on the job.

Individual copies of Service Guide 2.1 may be obtained without cost by writing the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

ADD THIS FEATURE

*-at a Savings!*

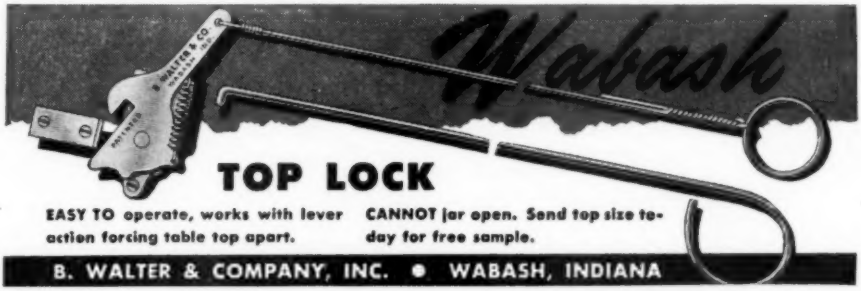
CLAMP NAILS **Wood Joint Fastener**

Customarily, any features added increase the price of a product, but not so with CLAMP NAILS Wood Joint Fasteners! You actually reduce your joining costs 50%, and at the same time you have a product that is immune to atmospheric conditions.

In using CLAMP NAILS, you use NO GLUE or intermediate joining agents that can dry out—you eliminate drying time, tools and space—you have a better, yet lower priced product. Consult us for recommendations on your production. Save—Sell for less—Produce a better product.

**CLAMP NAIL COMPANY**

4542 West Palmer St. Chicago 39, Illinois




**TOP LOCK**

EASY TO operate, works with lever action forcing table top apart. CANNOT jar open. Send top size today for free sample.

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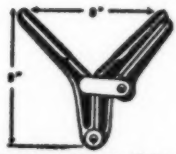
**"HARTFORD" CLAMPS**



No. 62 Mitre: Planed off jaws with hardened steel pins just long enough to hold work.

Style 18: Adjustable tail piece. Has many uses in furniture, boat and body plants. Also for welders.

Hand Screws: Hard seasoned maple jaws. Extra heavy steel ferrules.

32 Clamp Styles Available Write for free catalog Today.

The HARTFORD CLAMP COMPANY EAST HARTFORD, CONN. Est. 1915

BURTON STEEL HEAD BAND SAWS

Burton Saw Co.

WORCESTER 8, MASS.

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"Filer Finished" — Ready to use!

Try 'em, you'll like 'em.

LOG BANDS NARROW BANDS

*For*

**unmatched performance, job after job . . . specify**

# VICTORY

CARBIDE-TIPPED

# SAWS

**Regardless of the cutting job you put before VICTORY Carbide-tipped saws, you enjoy three big advantages: —**

- **INCREASED PRODUCTION**
- **REDUCED OPERATING COSTS**
- **SMOOTHER, FASTER CUTTING**

**WRITE TODAY!**

Send for literature or ask your supplier for full information on VICTORY carbide-tipped saws.

On many difficult sawing jobs, VICTORY carbide-tipped saws are cutting 40 to 100 times longer than ordinary saws before sharpening. Users also experience less down-time on machines and benefit thru reduced sharpening costs. Be sure to investigate these advantages for your plant.

**Victory** CARBIDE SAW & TOOL CO.

Sharpening & repair shop at
73 W. Industrial, P.O. Box 3026
Memphis, Tennessee

3856 N. ASHLAND AVE.
CHICAGO 13, ILLINOIS

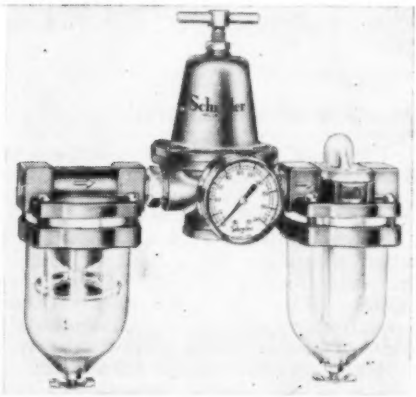
# EQUIPMENT and Supplies for the WOODWORKING INDUSTRY

## NEW LUB-AIR-ATOR

The new Schrader Lub-air-ator just released to the trade by A. Schrader's Son, Division of Scovill Manufacturing Company, Incorporated, 470 Vanderbilt Ave., Brooklyn 38, N.Y., offers low cost protection of air operated tools, cylinders, valves, and reduces maintenance costs.

The filter is a combination air filter, regulator and lubricator. It is fully automatic, easily cleaned and serviced without removing from the pipe line. The filter unit has a large area sintered bronze filter, baffle plate and drain cock for blowing out water and accumulation of foreign matter.

The regulator adjusts air flow from 250 p.s.i. inlet pressures down to 5 to 125 p.s.i. by simply turning regulator handle. Pressure gauge can be mounted front or rear of regulator.



The lubricator unit has a vibration-proof adjustment thumb wheel which regulates oil flow from a steady flow down to intermittent drops as needed. The transparent bowl which holds a full half pint, shows oil level at all times. Refilling is done through a special built in sliding seal covered port without shutting off the air flow.

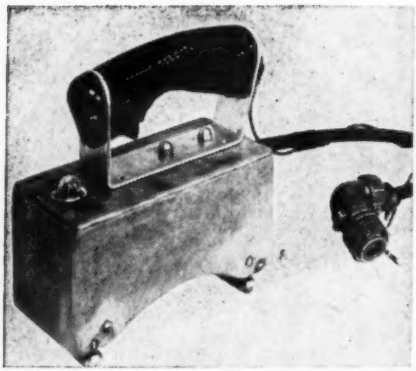
## LIGHT-WEIGHT GLUE GUN

A new, compact, efficient, wood gluing hand gun for use with Reevelec Woodbonders has been announced by Reeve Electronics, Inc., 609 West Lake Street, Chicago 6, Illinois.

The gun weighs only 40 ounces and requires no manual tuning. Load matching to varying amounts of glue line is completely automatic. It uses a light, highly flexible cable which appreciably reduces operator fatigue and permits easy application in tight quarters.

This gun measures 7" x 3½" x 3" and is constructed of polyester fiberglass. The electrodes are five inches apart providing improved "loadability" for glue line loads.

Reevelec Woodbonders have been redesigned for improved efficiency of operator with this new gun. The small



Woodbonder is now conservatively rated at 700 watts output for continuous operation. The large Woodbonder provides 1400 watts output during continuous operation.

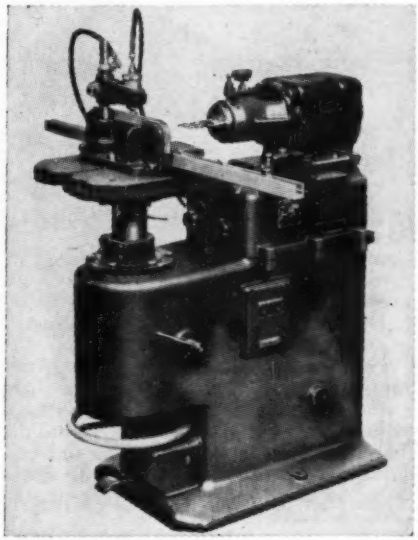
## SINGLE HEAD BORER

Supreme Woodworking Machinery Co. offers a new single head borer. The machine is available in pneumatic or foot-operated models, but the important features, such as the interchangeable drill units and the rotating work table are common to both.

The borer's versatility lies mainly in the drill units. These are available with 5/8", 3/4", and 7/8" spindles, with double or triple drill arrangements. Triple spindles can be in line, at 120°, or 90°. To change drills, the entire unit is easily removed, and a different one inserted.

Complementing this is the rotating work table, which is accurately calibrated for settings up to 90° either side of center. These adjustments for simple angle boring can not affect fundamental alignment of the table and drill. The work table has full rise and fall movement.

The single head borer can accommodate simple or compound angle boring, and compound end grain angle boring on irregularly shaped stock, by means of canting and rocking work fences.



Complete details are available from Supreme Woodworking Machinery Corp., 50-52 Howard St., New York 13, N.Y.

## GANG SAW SHARPENER

New gang saw sharpener described as being "loaded with new features" has been revealed by Hanchett Manufacturing Co., Big Rapids, Mich.

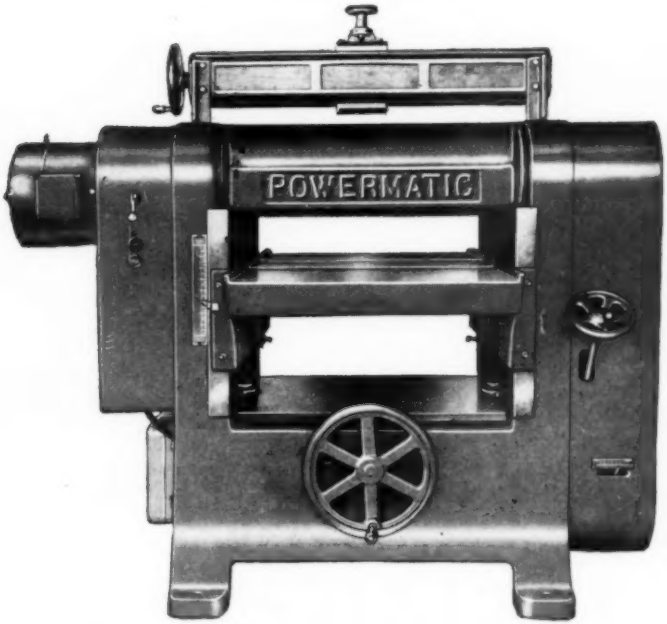
Known as the 5B model, the new Hanchett sharpener has a light adjustable carriage running on ball bearings with genuine finger tip quick return. Other new features include: an automatic air release for saw clamp during return of the saw carriage; air lift for the grinding head with finger tip action; a tri-

# POWERMATIC

## 224–24″ HEAVY DUTY SINGLE SURFACER

**A heavy duty finishing planer, ideal for the cabinet shop or production plant. Rate of feed from 20 to 100 feet per minute. All journals either roll or ball bearing.**

*Write for complete information.*




### CHECK THESE OUTSTANDING FEATURES

**Equipped with sectional chipbreaker and feed rollers. All feed rollers power driven with 1½ HP motor. Four (4) knife, safety type cutterhead, with speed of 3450 rpm. All moving parts completely guarded for safe operation. Equipped with 7½, 10 or 15 horsepower motors. IDEAL FOR ANY TYPE WORK, FROM CABINET MAKING TO PRODUCTION.**

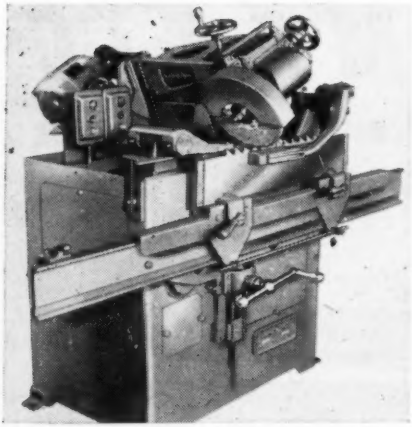
**Price ..... Less Motor ..... $1995.00**

**Also Manufacturers of 12″, 16″, 20″ Planers, Mortisers, Tenoners & Jointers**

*Manufactured by*

## POWERMATIC MACHINE CO.

**McMINNVILLE, TENN.**



mount head with airplane cable suspension, machined rockers and, most important, canted V guide ways; and variable speed drive for grinding wheel.

Rocker connections are full ball bearing, lateral adjustment is included for grinding wheel, and there are adjustable roller bearings on cam shaft, grinding wheel spindle, feed finger arm and feed arm. Other bearings are of ball or roller type. Cams are mounted on ends of cam shaft.

## SURF PLANK

A new decorative lumber planking, suggestive in appearance of ocean-washed driftwood, easily worked and low in cost, has just been placed on the market.

Known as Surf Plank, this product of United States Plywood Corporation is recommended both for home and commercial use.

Strikingly unique in its general character, the grain of the wood stands out in relief from the etched-out background. The long edges of the planks are ship-lapped so no special vertical joint treatment is needed. Surf plank comes in three widths, 6, 8 and 10" and in varying lengths from 4 to 10". It is ⅝" thick.

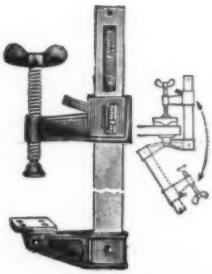

insist on famous

" TRADE MARK Jorgensen " REG U S PAT OFF

AND " Pony " REG. U. S. PAT. OFF.

CLAMPS

ASK YOUR SUPPLIER



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ADJUSTABLE CLAMP CO.

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418 N. Ashland Ave. • Chicago 22, Ill.

WHERE *Quality Counts*

*Wabash*

**SMOOTHER ACTION SLIDES**

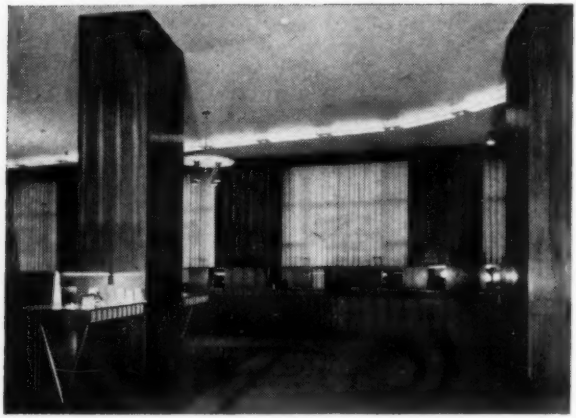
THE WOMAN chooses . . . and she selects tables that work smoothly . . . easily. That's why Wabash equipped tables sell better. Wabash Slides are precision made of hardwood . . . engineered for easy operation . . . with more than sixty-seven years of table slide "know-how" behind them. Write today for more information.

***for your new patterns . . . consult WABASH!***

**B. WALTER & CO., INC. WABASH, INDIANA**

*Walter of Wabash*

# "Design In Hardwoods" Awards



*Architectural Design Class —Presented to Harper Richards for his outstanding modernization of the old-fashioned interior of the National Boulevard Bank of Chicago. Walnut plywood has been featured.*

A delicately tapered dining or occasional armchair, a graceful coordinated office furniture grouping, contemporary demountable storage shelves, a remodeled bank interior, a combination office-showroom and a folding wood door were the designs that won their creators awards for "highest honors" in the 1955 "Design in Hardwoods" awards selection held in conjunction with the Hardwoods Exhibit at Chicago's world-famous Museum of Science and Industry.

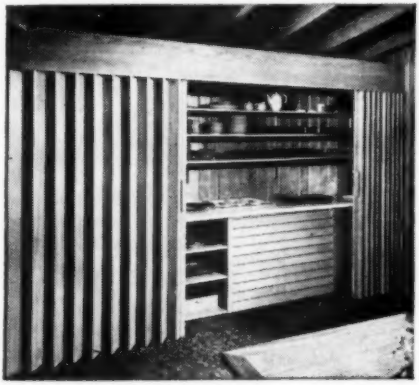
Winners of the six awards for highest honors were Charles U. Deaton, Kirkwood, Missouri, and Paul W. McCobb, New York City, in the production furniture division; W. C. Muchow,

*Furniture Design Class — Award to Charles U. Deaton, Kirkwood, Mo., for his contemporary designs for the "Document Suite" made of American walnut by the Leopold Co., Burlington, Iowa.*

Boulder, Colorado, in the custom furniture division; Harper Richards and Henry P. Glass, both of Chicago, for architectural interiors; and Rolscreen Company, Pella, Iowa, in the general products division.

### Trends Revealed

Design trends, as revealed by the hundreds of entries submitted, included a continuing increase in emphasis on wood's warm, natural tones and distinctive grain variations. Individual



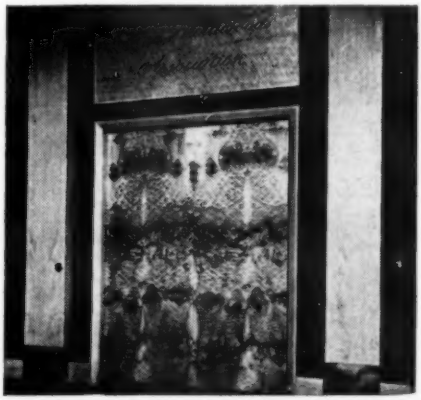
*General Products Design Class—Award to Rolscreen Co., Pella, Iowa, for the versatile veneered folding door resembling plank paneling. Ideal for divider walls, closet doors, etc.*

grain patterns were often employed to interpret the formal or casual mood of a design; or were used symbolically, as in one case where a wood figure suggests the leaves of a prayer book in a temple.

Graceful, fluid proportions—even in large case pieces—were the dominant furniture trend shown. In today's softer, more versatile new designs, the skilled use of strong modern plywood (bonded) construction eliminates much bulk, and the artistic sculpturing of sturdy solid woods lends a timeless refinement to contemporary designs.

*Production furniture award presented to Paul W. McCobb for his delicately tapered occasional or dining room chair of solid mahogany.*

In entering their favorite works, designers and architects mainly chose those in woods with informal, unmatched natural variations such as found popular today in cherry, mahogany and walnut.



*Fine Hardwoods Association entrance. Designed to show variety of hardwoods.*

# Mechanics Through the Ages

IN 1357 YOU COULD BUY SUCH WARLIKE FIXTURES AS BATTLE-AXES, GANTLETS AND BRACERS FROM LONDON IRON MONGERS, AS WELL AS POTS, PANS, PITCHERS, UPHOLSTERY, BEDDING AND CARPETS!
IN ANCIENT INDIA METAL WORKERS AND OTHER CRAFTSMEN SERVING THE CITIES USUALLY LIVED IN SUBURBAN VILLAGES SET ASIDE FOR THEM. ONE SUCH VILLAGE OF BLACKSMITHS, IT IS SAID, CONTAINED 1000 FAMILIES—!
EARLIEST STEAM ENGINES WERE MADE MOSTLY OF WOOD; METAL WAS USED TO MAKE ONLY THOSE PARTS THAT WERE EXPOSED TO THE FIRE!

# Good News Gets Around...

## Moak Single Spindle Shapers and Speedikut Cutters

**TO MAKE FAST-SELLING SHAPED WOOD PRODUCTS**

**What a combination!**

***Moak Single Spindle Shapers*—with speeds up to 12,000 rpm, precision ground table, simple adjustments.**

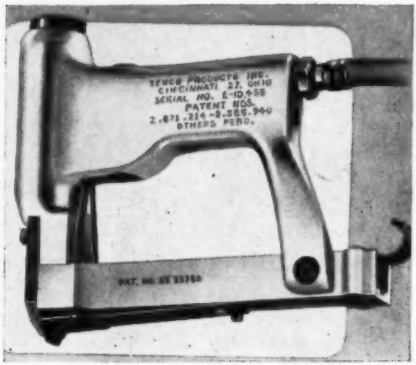
***Moak Speedikut Cutters*—precision ground from hardened 18-4-1 high speed steel, undercut to maintain original balance when re-ground, and true form relieved.**

**Together, they produce rapidly and at low cost the various shapes for furniture, moldings, copings, cabinet-work, sash and paneling that add smart finishing to woodwork.**

***Get the facts* on Moak Shapers and Speedikut Cutters. Write for colorful illustrated booklets today.**

## SENCO MODEL "E"

This newly developed tacking tool has a feather touch tripping action which eliminates all effort in achieving terrific speed. It is used like a hammer driving wide crown or narrow crown staples of an industrial type 5/32" through and including ⅝" long.

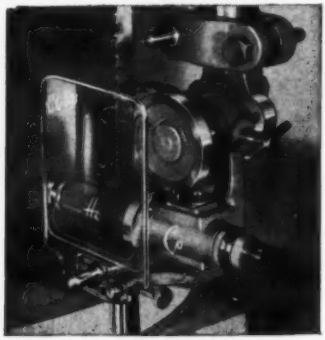



This tool has been developed and all information can be furnished by writing Senco Products Inc., Cincinnati 27, Ohio.

## "HOCO" GUIDES

Werner Maag, U. S. office, 2011 Rosemont Ave., N.W., Washington, D.C., is offering a new bandsaw guide.

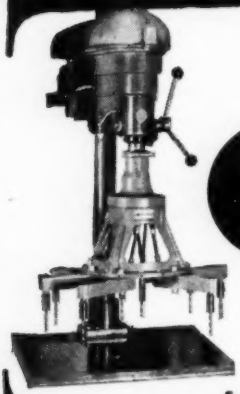
Illustration shows the Hoco copying attachment with protecting shield No. 57 for the manufacture of mass-produced articles. The copying attachment together with the protecting shield is



fitted to the guide with two screws. The saw blade can thus run accurately in the center of the copying pin. When not in use, the copying pin can be removed in a few seconds.


FASTER HOLE PRODUCTION

with Commander MULTI-DRILLS



DRILLS UP TO 22½" BOLT CIRCLE

• Drills up to 8 Holes at 1 Stroke • Fits Any Drill Press
• Adjustable to Any Hole Pattern
• Quickly Pays for Itself Many Times Over

● Commander MULTI-DRILLS are instantly and easily adjusted to handle any hole pattern within a 9" circle. Standard Extension Spindles will increase working area to 22½". Minimum center distances close as ½". Compact in design, ruggedly built, Commander MULTI-DRILLS are making BIG Savings in time and labor for wood-working plants everywhere. Special adaptations available.

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Lists of Used and Rebuilt Machinery, either For Sale, Wanted, or For Exchange, set in uniform style, will be published in the Classified Section at the rate of $7.50 for name and address and a five line advertisement. For additional lines, only 75c per line.

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Borers, Greenlee No. 370 6 ft. horiz. dmd
Borers, Moak 8S 2 Spindle horiz. dmd
Borer, W&M 283-B, bb, dmd, single spindle
Boring & Sawing, McKnight 26F dmd
Clamps, Handy No. 71 revolving
Clippers, Coe 88" bed and motor
Dovetailers, Dodds, 20 spindle
Frequency changers, 30 KW and 33 KW
Glue Jointer, Diehl No. 66 bb-dmd
Glue Jointer, Jenkins No. 343A bb-dmd
Glue Spreaders, 12" Black Bros. dmd
Jointers, Glue, Yates-American No. 213 bb-dmd
Jointers, New Moak 12" bb-dmd
Jointers, Porter 16" and 24" bb-dmd
Jointers, Yates No. 199, 12" bb. v-belt drive
Kiln Trucks, 4' & 6', roller bearing
Lathe, Yates No. 74 bb-dmd
Mortiser, Sidney, single-spindle pb. bd.
Mortiser, New Britain No. 7 bd & motor
Mortiser, W&M No. 238—5 spindle Horiz. dmd
Moulders, Mattison No. 222, 6" bb-dmd
Moulders, Vonnegut 12" bb-dmd
Moulders, Yates-American C88, 8" bb-dmd
Moulders, Yates-American C-89—6" bb-dmd
Planers, Oliver No. 169, 30" double bb-dmd
Planer, Facing, Yates-American 36" with Jackson & Church feeder on base, bb-dmd
Planers, F&E—30" double, pb. bd & motors
Planers, Whitney No. 24—30" double bb-dmd
Planers, Berlin 36" round head dmd
Planers, New Crescent 24" bb-dmd
Planer, F&E No. 156 36x7 dmd. round head
Planer-Matcher, Yates A1-15"x6" round heads pb. bd.
Redrier, Merritt 12 plate 36x72
Routers, Defiance single spindle high speed dmd
Sander, Yates No. 430, semi-stroke, bb-dmd
Sander, Yates No. 431—43" 3 drum endless dmd
Sander, Solem 2 drum endless 36" bd.
Sanders, Niagara brush, bb-dmd
Sander, 48" double disc, dmd
Sanders, F&E 60" 3-drum roll feed, dmd
Sanders, McKnight single drum 24"x16" dmd
Sanders, Porter Cable vertical oscillating dmd. sgl. spdl.
Sander, W&M No. 171 belt bb., m.d.
Sanders, W&M No. 294 8 ft. stroke, bb-dmd
Saws, F&E No. 500 variety bb-dmd
Saws, Greenlee No. 493, variety, bb-dmd
Saws, Hermance Gang Rip, pb & motor
Double Cut Off Saw, Jenkins 105-A 60x96 with copes, bb-dmd
Saws, New Delta-Crescent 12" tilting arbor dmd
Saws, New Multiplex 40A & 50A
Saws, Porter C-43, cutoff, bb-dmd. & tables
Shaper, Defiance double spindle, bb-dmd
Shaper, Whitney No. 389, double bb-dmd
Shapers, New Moak single spindle bb-dmd
Shapers, Greenlee No. 180 double bb-dmd
Shaper, Whitney double spindle, bb-dmd
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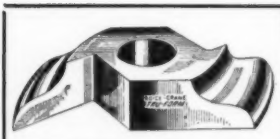

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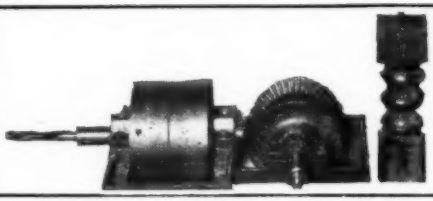

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Trailerloads or carloads

**WANTED**

Man to manage small millwork shop in western suburb of Chicago. Must be capable of estimating, set-up and complete details. Wonderful opportunity for right man.

*Apply by letter stating qualifications.*

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Experienced Cabinet Foreman for factory producing veneered bedroom furniture. State age, experience, and salary desired in first letter.

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**DIEHL TAPELESS SPLICER,**
**MERRITT TRAVELLING HEAD JOINTER.**

Please advise age, condition and best cash price.
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**Wheaton, Illinois**

**WANTED — SUPERINTENDENT**

Must be thoroughly experienced on high grade occasional tables. Must know operations from dry-kiln, all woodworking machinery, through shipping department. Good size plant located in Chicago, Ill. Excellent opportunity for man with above qualifications—security assured.

*Write qualifications, references and salary expected.*

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**c/o WOOD WORKING DIGEST**
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Man for Administrative Assistant with experience in plywood manufacture, plywood sales and market development. New England location. Please give qualifications with application.

**OWENS-ILLINOIS PLYWOOD CO.**
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Nobody's opinions are entirely worthless. Even a stopped clock is right twice a day.

## BENDING MACHINES

Handy Bending machines, 40", 6 different size rolls
Handy 52"

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Andrews 6 spindle horizontal belt drive
Greenlee Single MD Vertical
Greenlee No. 363 Vertical 6 Sp. BB DMD
Moak 2 spindle Radial, Silverstreak
Root Single MD vertical
Root single vertical MD, Motor Feed
Root Vertical Hydraulic straight in line 7 spindle Model CH
Towsley 2 spindle, 2" to 16" with foot tr.

## COMPRESSORS

Ingersoll-Rand, 5 HP
Westinghouse, 5 HP
Westinghouse, 10 HP

## DOVETAILERS

Dodds 10, 15, 20 spindle

## DOWEL MACHINES

Hawker No. 2 All Ball bearing & roller bearing VBD

## JOINTERS

American 12" Wedge Bed BB
American 16" Wedge Bed BB
Crescent 12" DMD
12" Colloday L. Powers, H. B. Smith, Crescent, Sidney
Newman 12", DMD, 5 HP, BB
Porter 12", BD
Northfield 12" DMD
Oliver 16" BB—8 ft. Table
Yates-American 16" DMD
Tidy 16" 3/15 Carbide Cutters BB
Tidy 16" P plain cutters

## MORTISERS

Greenlee No. 228, Belt Drive
New Britain No. 2 and 7
Northfield chisel mortiser, motor driven
Wallace chisel mortiser, motor driven

## MOULDERS

Mattison No. 262 6" drip bed 6 motors
Sherrill 6" MD BB
Yates-American, 18" DMD C55, BB

## PLANERS

American Saw Mill 24" CMD, 5 HP
Buss type 88, 30" double DMD, Knife Gr.
Yates-American No. 34, 24" sgle., DMD, BB
Greenlee No. 120 30" Double DMD DMF knife grinder
Monarch 20" CMD 5 HP with starter, New $675.00
Northfield 24" single, MD motor fd. No. 5
Porter 24" with herzog feed
Whitney No. 32 36" BB CMD Knife Grinder
Whitney No. 29, 40" CMD, BB

## ROUTERS

Ekstrom Carlson No. 156
Ekstrom-Carlson 434
Onsrud Air
Onsrud 240
Porter No. 612
Porter No. 666

## SANDERS

Beach Hand Block MD 2 HP
Mattison 176 osc. 5 HP
Newton Edge Sander
Oakley Model H Drawer DMD
Yates-American No. 431, MD, 3 drum endless bed sander
Peerless 9", 14" and 20" horiz. & vert.
Vonnegut vertical drum sander
Wysong & Miles, Oakley, Mattison belt

## SAWS

Fay & Egan No. 558 MD 1½ single phase
Crescent (extension base) V-belt drive
Yates-American No. M-81 t.a., DMD BB saw
Famous No. 66, TA, DMD, BB
Walker-Turner TA 5 HP motors

## SAWS - CUT OFF

Heston & Anderson No. 5, No. 25 & No. 55
Multiplex 5 HP DMD BB
Mattison No. 244 DMD BB 5 HP motor
Porter No. B43
Wallace 2 HP DMD BB
DeWalt 1 to 5 HP DMD BB

## SAWS - BANDSAWS

36" American, Tannewitz, Crescent, Oliver
30" VB Drive Crescent
27" Crescent Band Saw
32" Crescent guarded BB VBD
Northfield BB & DMD 20" to 36"
Yates-American B36 fully guarded DMD

## SAWS - RIP SAWS

Mattison No. 202 straight line
Tidey 48" carriage
Tidey 30" carriage & boring attachment

## BAND RIP & BAND RESAWS

Yates No. 281 Band Rip

## SAWS - VARIETY

Beach DMD 5 HP Tilt Arbor
Delta 5 HP Tilt Arbor
Northfield Tilt Arbor, DMD, 5 HP
Northfield Tilt Top DMD
Fay & Egan DMD Tilt Arbor 5 HP
Pryibil No. 10 Tilt Top, BB all Alum. gages
Tannewitz Type U 5 HP DMD 36" Rip Cap.
Whitney DMD tilt arbor No. 77
50 other makes to choose from

## SHAPERS

Advance Single spindle, clutch-driver, BB
American (S30) Sgle. spdle., 5 HP & 3 HP
Colladay SS BB 5 HP
Oliver No. 287 large top 7½ HP
Onsrud No. 200
Colladay SS BB 5 HP
Whitney BD No. 89 single, large top
Whitney No. 34A Double

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St. Joe MD, 66" Trimmer
Greenlee Sash & Door No. 601

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Tannewitz G-1 36" Ball Brg. V belt M.D.
Crescent 36" Ball Bearing DMD
Oliver No. 173 Jig Saw, 36", Motor drive
Crescent 36", V-Belt, Motor Drive
American 42", V-Belt, Motor Drive
Silver 20", V-belt motor drive

**BAND, RIP AND RESAW**
McDonough 62", vertical band resaw
Mershon 42" Twin Band Rip, B.B.

**BORING MACHINES**
Jenkins No. 123 Gang Stile Borer and Motor
Bell No. 24B Double End Bor., Chesk. & o/o
Rogers single spindle, horizontal
McKnight No. 26-F, double end, M.D.

**BLOWERS AND FANS**
American size 40 Type E "TWIN" & motor
American No. 80-E with 40 H.P. coupled motor

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Francis 3'x8' Hand Screw Veneer Press
Greenlee No. 599 frame and furniture clamp

**FILING ROOM MACHINERY**
Hanchett 76" style DN Knife Grinder, M.D.
Covel Hanchett OK 42" Knife Grinder, M.D.
Wardwell Y-18 Circular Saw Filer, M.D.

**JOINTERS**
Diehl No. 66, continuous feed, direct M.D.
Yates No. 199, 20" round head V-belt M.D.
Porter No. 300 CM, 12", D.M.D., B.B.
Meyers continuous feed, V-belt, M.D.

**LATHES**
Oliver 66A; 30-48" swing Gap Lathe; B.B. M.D.
Porter 16"x10' Bed Cabinet Makers Lathe
Oliver No. 25 20"x12' Bed Pattern Makers Lathe
Smith B-42 Ball Brg. Auto. Variety Lathe

**MORTISERS**
Wysong & Miles No. 284 Auto. Hollow Chisel
Greenlee No. 227 hollow chisel, mtr. driven.
Sidney No. 707 Chain automatic feed M.D.
Sidney 705 Hollow Chisel Automatic feed, M.D.
Whitney No. 67 Oscillating Bit, M.D.
New Britain No. 2 Chain with motor

**MOULDERS**
Vonnegut 6" All Electric
Yates-American C-89, 12" All Electric
Woods No. 134-M 4" Electric
Newman 4x4, All Electric
Yates No. 106, 10" belt drive coupled motor
Yates-American C-89, 6" All Electric
Woods No. 132 M 6" Electric

**NAILING MACHINE**
Diehl No. 40 16 track 40" open back
Auto Nailer "Blue Model," M.D.

**PLANERS**
Whitney No. 32 24" Single, Ball Bearing, M.D.
Whitney No. 32 30" Single, Ball Bearing, M.D.
Yates No. 156 30" Single, Ball Bearing, M.D.
Yates B-2 36" double, M.D.
Yates No. 156 20" round head, M.D.
Yates No. 177 30"x12" double M.D.
American No. 80 15" double, heavy duty

**ROUTERS**
Porter No. 612 Hi Speed Vert. Ball Brg., M.D.
Ekstrom-Carlson No. 126, B.B., M.D.

**SHAPERS**
Onsrud W125B Two Head Automatic, Mtr. Driven
Whitney No. 239 Double Spindle, D.M.D.
Porter No. 103 single, ball bearing, M.D.
Whitney No. 165 S.S. motor on arbor
Whitney No. 47A, dbl. spdl., short belted m.d.
Greenlee No. 150 double spindle, D.M.D.
Whitney No. 250 Double Spindle, D.M.D.

**SANDERS**
Salem No. 370 42" Two Drum
Yates-Amer. No. S-23 43" 3 dr. roll feed D.M.D.
Yates No. 421 6-drum with motors
Fay & Egan 30" 2-drum end. bel., M.D.
American No. 2 Disc and Spindle Combination

**MITRE SAWS**
American No. 1 Tilt Table, V-belt drive.
Whitney No. 61 tilting arbor, D.M.D., B.B.
Walker Turner 10" Tilt Arbor, B.B., M.D.

**CUT-OFF SAWS**
Sidney No. 720 Straight Line, motor on arbor
Oliver No. 94-D Straight Line, Motor on arbor
American No. 51 swing saw, M.D.
Multiplex No. B-60 radial arm, 7½ H.P. motor

**RIP SAWS**
Mattison No. 202 chain-feed, dir. mtr. driven
American self-feed with motor
Greenlee No. 426 Roll Feed with motor

**TENONERS**
Greenlee No. 534 Single End, No Copes, DMD.
Jenkins No. 95 double-end, D.M.D.
American No. 1 Single End, belt drive

**This is only a partial list — send or call your inquiries**

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Borer, vert., Greenlee No. 371, 12', power feed
Borer, horiz., Greenlee No. 370, 72", 4-spindles
Circular Resaw, American, tilting roll
Clamp Carrier, Palmer 16-sec., 132"x30", cap., 128 clamps
Corrugated Fastener Driver, Doig, with motor
Dowel Machines, Tannewitz, Hawker & Jenkins
Factory Trucks, 4-wheel, various sizes
Glue Jointer, ballb., F&E No. 429, 3-motors
Lock Corner Cutter, Superior, single-end, hand-feed
Lock Joint Machine, Defiance, 2-motors
Mortiser, h.c., vert., F&E No. 172, foot feed
Mortiser, h.c., Am. No. 20, power feed, motor
Moulder, inside, Am., No. 34, 15"x6"
Moulders, elec.: Eaglesfield 10"; XL 4" Mold-matcher
Moulder, 4-side, Hermance 8", motor
Nailers: Doig 8 tr., cl.-back; Doig 6-tr., clsd. bck.
Planer, dbl., Whitney 30", ballb., 3-mtrs., No 24
Planer, sgl.-cab., 30" Whitney No. 32, ballb., mtr.
Printer, Boxboard, Hooper 20", chain-feed, 2-color
Ripsaw, self-feed, Greenlee No. 426
Ripsaw, chain-fd., Mattison No. 207, 2-motors
Ripsaw, gang, Hoosier, ballb., 14" arbor, self-feed
Radial Saw, Multiplex, 5 h.p.
Sander, 3-dr., e.b., Yates No. 431, 43", hoods
Sander, 3-dr., F&E 36", roll-feed
Sander, sgl.-dr., Parks 24", power-feed
Sander, 3-dr., e.b., F&E No. 393, 30"
Sander, sgl.-dr., Yates-Am. No. 411, 42", motor
Sander, 36", disc, 24" drum
Sander, moulding, Pearson
Sander, hd. block, W&M No. 171, 5 h.p., 2-yrs. old
Sander, edge belt, E-C No. 112
Saw, double-end, belt, mitre, 72"
Saw, cut-off, Porter C-43, st.-line, 5 h.p.
Saw, double-end cut-off, Am. 80"x48"
Shapers, double Whitney & Advance, m.d.
Shaper, Onsrud No. 200, single-spindle, 5 h.p., two-speed motor
Stapler, 4 head Saranac 60" open-back
Surfacer, dbl., Y-A No. 177, 30"x12" ballb., mtrs.
Tenoner, single-end, Powermatic No. 2-A, ballb., copes and cut-off saw, motors
Tenoner, dbl.-end, elec., Jenkins No. 90, 78"

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Tannewitz G 36" & Amer. B-36" B.B.
Tannewitz PH-30" & Oliver 30", D.M.D.

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Root G250 Foot-Feed Vertical single
Root G300 Heavy Duty Hyd., vert. single
Root GMC light-duty foot-feed vert. mult.
Greenlee No. 369 3-ft. vert. multiple, m.d.
Greenlee No. 369D 6-ft. vert. multiple, m.d.
Greenlee No. 386C 8-ft. vert. 16-sp. m.d.
Root D210 heavy-duty hyd. horiz. single
Root D200 4-ft. hyd. horizontal multiple

### CARVERS

Perter and Gallmeyer & Livingston single sp.

### CLAMP—CLAMP CARRIERS

Handy No. 50 drawer and cabinet clamp
Handy No. 444 two-way air clamp
Handy and Union revolving case clamps
Lancaster No. 1000 air chair clamp
Taylor 7½-ft. 40-sec. chain-type carrier

### DOVETAILERS

Dodds 15-spindle, spiral gear

### JOINTERS—GLUE JOINTERS

6, 8, 12, 16 and 20-in. hand jointers
Porter CM 16-in hand jointer, direct m.d.
Diehl No. 60 continuous feed glue jointer
Fay & Egan No. 429 continuous feed glue jointer

### LATHES

Imperial automatic turning, direct, m.d.
Mattison No. 57-D automatic turning, m.d.

### MORTISERS

Wysong & Miles No. 284, P.F., hollow-chisel
Wysong & Miles No. 288 5-sp. hollow-chisel
New Britain No. 2 chain saw mortiser, m.d.
Enterprise ball-brg. pulley mortiser, m.d.

### MOULDERS

Mattison No. 229, 9-in. all-electric, 4-side
Y-A No. 26-A, 12-in. 4-side, motor driven

### PLANERS

Hall & Brown No. 222, 18" single head, d.m.d.
Whitney & Yates 24" single head, motor drive

### ROUTERS

Onsrud W-240 high speed electric

### SANDERS

Smith No. 4C1, 42" 3-drum endless bed
Fay & Egan 48" 3-drum endless bed
Wysong & Miles No. 275 hand block belt sander
Wysong & Miles No. 291, 6-ft. panel sander
Wysong & Miles No. 294 automatic stroke sander
Wysong & Miles No. 289 oscillating edge belt
Wysong & Miles No. 309, 30" comb. Disc & Sp.
Root M207 48" sgle. disc sander, m.d.
Wysong & Miles No. 310, 36" double disc sander
Peerless 20" vertical belt sander, 5 HP

### SAWS—CUT-OFF—SAW TABLES

Bell No. 216 cut-off saw, m.d.
Bell No. 12-B double miter & cut-off saw
Y-A No. 8 tilt-arbor, roller table, m.d.

### SAWS—CHAIN-FEED—SELF-FEED

American No. 25 chain feed rip, d.m.d.
Mattison No. 207 chain feed rip, d.m.d.
Hermance No. 300-G self-feed, d.m.d.

### SHAPERS

Porter No. 200 SVM & Whitney No. 89 sgle. spdl.
Whitney No. 134 and No. 150 dble. spdle., m.d.
Jones-Superior No. 105 dble. end serpentine

### MISCELLANEOUS

Capital 65" veneer clipper
Hawker No. 1 dowel rod machine, m.d.
GRUPP 25" hyd.-feed lock-corner machine
Hermance No. 23 single end tenoner, m.d.

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CURTIS No. 51, Hand Block Belt Sander, roller table 91"x36", vertically adjustable 16"
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Delta 20", with motor, new
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American No. 111—54", opens 16" wide
McDonough 54", with motor

**LATHES**
Oliver No. 50B—60 in. centers, M.D.
Blount No. V-22 M.D., new
Y-A No. T5—30" Auto, 175" Heads

**MORTISERS**
Brackett Hollow Chisel, M.D.
New Britain No. 7 M.D. No. 3 Chain Saw
New Britain No. 2 Chain Saw 4 cutting outfits
Crescent M.D. Hollow Chisel 1½ HP

**MOULDERS**
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Yates C-3-4", 4 Side
American No. 22—14" 4 side
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Cresecent No. P 24-24x8" M.D.
Berlin No. 185—30x8 Dbl. M.D.

**JOINTERS**
Fay & Egan No. 316-24" Fay & Egan 16"
Yates-American 6" M.D.
American 30" with Feeder, M.D.

**RADIAL SAWS**
Delta 1-2-3 & 5 HP
Walker-Turner 3 HP, 3 phase, Bench Model
DeWalt model GR6—3 HP 3 phase
5 HP Multiplex 3 phase

**RIP SAWS**
Mattison No. 205 Chain Feed with Motor

**SANDERS**
Mattison No. 131 Hand Block Belt Drive
Hermance and Fay & Egan arm type
Peerless No. 5—20" Vert. Belt, M.D.
Yates No. 427 Belt M.D.
Yates-American No. 401—43" Motor drive
Yates No. 431—49"—3 drum Endless Bed

**SAW TABLES, VARIETY**
Delta 10" Unisaw 1 HP Sgl. ph. motor
Delta 12" Tilt Arbor 5 H.P. New
American Tilt Table, Belt Drive
American Double Arbor
North Field 5 HP Tilt Arbor

**SHAPERS**
Crescent Single Spindle, 2 HP
Whitney Double Spindle, 5 HP motors

**TENONERS**
Hall & Brown No. 55 and No. 1 American
Harris Floor Model with motor

**VENEER PRESSES**
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40 Section Taylor Hand Operated Clamp Carrier
Taylor Panel-Flo Edge Gluer
Ray Bond Electronic Lumber Edge Gluer
Handy air Operated Revolving Case Clamp
Two—40 Section Taylor Power Operated Clamp Carriers

### DOVETAILERS
Dodds 12 and 15 Spindle Dovetailers
Wysong & Miles No. 290 Auto. Dovetailing Mach.

### GLUE SPREADERS
54" Union Dble. Rubber Roll Resin Glue Spreader
86" Black No. 22D Rubber Roll Resin Glue Spreader

### GRINDERS
Covel-Hanchett Band Saw Grinder
Practically New Stetson-Ross No. 372 Grinder

### JOINTERS
Yates-American No. 213 Direct Motor Driven Glue Jointer
24" Yates-American No. 1 Jointer

### LATHES
Yates-American 42" No. 74, mtr. dr., ball bearing
Yates-American 30" T-5, motor driven ball bearing
Mattison 30" MD automatic Lathe with 40" of new heads and carriers

### MATCHERS
Woods 501M Direct Motor Drive. Ball Bearing Hardwood Flooring Machine
Yates-American E-33 Elec. Ball Brg. End Matchers
Yates-American E-1 Electric End Matchers
Yates-American A-20 Planer & Matcher, Belt Drive, Ball Bearing
Yates-American A23 Elec. Hardwood Flooring Mch.

### MORTISERS
Greenlee 72" No. 212M 5-spindle direct motor drive, ball bearing mortiser.
Wysong & Miles No. 286 hinge seat mortiser
Wysong & Miles No. 288 direct motor driven 6 spindle mortiser

### MOULDERS
Yates-American 6" No. C-75 Electric Moulder
Newman 10" No. 412 Electric Moulder
Practically New Stetson-Ross 8" Type 48-K Fast Feed Electric Moulder, with hopper feed
Vonnegut 6" Electric Moulder
Vonnegut 10" Electric Moulder
Vonnegut 12" Electric Moulder

### SINGLE PLANERS
Buss 40" direct motor drive, ball bearing
Greenlee 36" No. 110 Direct Motor Driven
Whitney 36" No. 29 Direct Mtr B.B. Sgle. Planer
Buss 36" Direct Motor Driven Ball Bearing Single Planer

### DOUBLE PLANERS
Whitney 24", 30" and 36" No. 24 direct motor driven ball bearing, with grinder and jointer

### SANDERS
Wysong & Miles No. 171, MD., BB., Belt Sander
No. 277 Semi-auto. Belt Sander
Curtis Semi-auto. Belt Sander
Mattison No. 124 Automatic Stroke Sander
Mattison No. 137 Motor Driven Ball Bearing Belt Sander.
Pearson Waterfall Sander
Oakley Model E Double Sander
Yates-American 42" No. 423 Direct Motor Driven Ball Bearing Endless Bed Sander

### BAND SAWS
American 48" Vertical Ball Bearing Band Resaw
American 44" Band Resaw
American 40" No. 4 Band Resaw
36" Yates-American Motor Driven Ball Bearing Band Saw
Yates 54"—54V ball bearing vert. band resaw

### CUT-OFF SAWS
Beach No. 3 Roller table double cut-off saw
Fay & Egan No. 501-A Direct Motor Driven Ball Bearing Swing Saw
Eaglesfield Direct Motor Driven Ball Bearing Swing Saw
Porter C-43 Straight Line Cut-Off Saw with table
Wilkin-Challoner No. 8208 Direct Motor Driven Ball Brg., Chain fd., dbl. cut-off saw with copes

### RIP SAWS
Eaglesfield Direct Mtr. Dr. Ball Brg. Rip Saw
New Marion Glue Joint Rip Saw, in stock here
Mattison No. 202 Glue Joint Rip Saw
Mattison No. 207 Direct Motor Driven Ball Bearing Glue Joint Rip Saw
Yates-American G-67 Chain Feed Rip Saw
Dependable No. 1 BB Gang Rip Saw, Power Feed

### ROUTERS
Yates-American U-9 Electric Router

### SHAPERS
Whitney No. 234 Double Spindle Electric Shaper
Onsrud W-125 Double Spindle Automatic Shaper
Onsrud W-125 Single Spindle Automatic Shaper

### TENONERS
Wilkins-Challoner No. 720 Elec. Dbl. End Tenoner
Wilkins-Challoner No. 70 Elec. Dbl. End Tenoner
Jenkins No. 95 Electric Double End Tenoner

### VENEER MACHINERY
Coe 76" Lathe
Coe 88" Clipper
Francis 76" Hydraulic Veneer Clipper
Dennis Veneer Taping Machine Motor Driven
Francis 84x36" hydraulic veneer press, M.D., with booster pump and overhead cranes
Merritt 13 Plate redrier 60 by 36

### MISCELLANEOUS
Salstrom 18-spindle Carver
Wardwell Saw Filer
Morgan 7-track open back nailer with clincher
Williams Motor Driven No-Knife Hog
3—Leitelt Lumber Lifts
Plycor 10 openings, 80"x60" Hot Press
Columbia, 3 and 4 openings, 100"x50" Hot Press

**Sutton WOODWORKING MACHINE CO.**
**PHONE 2-4186** **SEDGEFIELD INN** **GREENSBORO, N. C.**

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**Compiled for quick reference and for your convenience, this handy index of products shows the pages on which you will find the items advertised in this issue. When writing to advertisers, it will be appreciated if you will mention WOOD WORKING DIGEST.**


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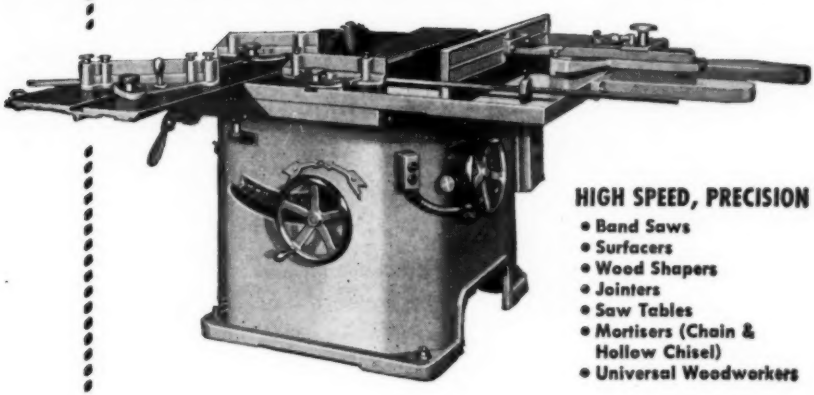
# NORTHFIELD
# No. 4 VARIETY SAW
*Tilting Arbor Type*

**Arranged with both rolling table and extended table**



**HIGH SPEED, PRECISION**

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- Surfacers
- Wood Shapers
- Jointers
- Saw Tables
- Mortisers (Chain & Hollow Chisel)
- Universal Woodworkers

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A 19½" extension for carrying the rip gauge is furnished with standard 44" x 36" wide table. An additional 12" extension and rolling section are optional.

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We guarantee perfect satisfaction to anyone who may purchase our machines, and if any reasonable exceptions are taken to their good performance, they may be returned at our expense.

**Northfield FOUNDRY & MACHINE CO.**

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# with BADGER CARBIDE CUTTERS

## you can run *10 times longer!*

**ONE USER REPORTED** that, after switching to carbide, he could run continuously for a week whereas formerly he had to shut down twice a day for sharpening. Standard Clamp "T" Slot and Clamp Type Cutterheads of any make can be converted to carbide operation by adding the tips to conventional milled-to-pattern bits. While the cost of carbide tipped bits will usually run three times more than high speed steel bits, the considerable increase in life and reduced down time results in reduction of net over-all operating costs.

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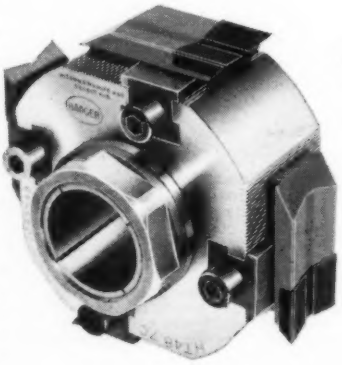
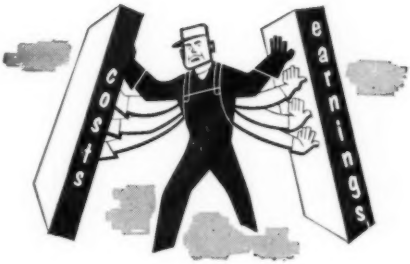


*Send us details of your cutting problems today!*

**WISCONSIN KNIFE WORKS** BELOIT, WISCONSIN

*Engineers to the Woodworking Industry!*

# ROUGHY... fights the squeeze between costs and earnings!




"Roughy" is a fighter with a knock-out punch for costs. "Roughy" is a wrestler who constantly wrestles that squeeze between costs and earnings.

"Roughy" is the nickname for Porter-Method-Rough-Mill-Systems, a nick-name used by rough mill operators who know what he can do for them.

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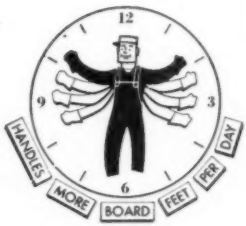


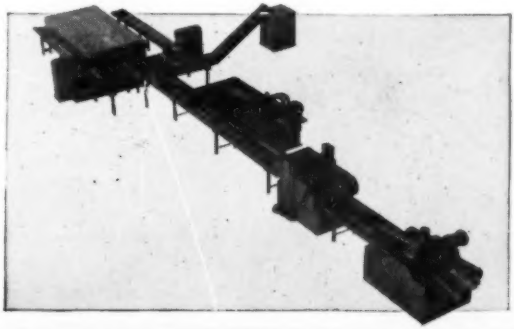

*Please send my copy of "More Board Feet Per Day" which tells me how to fight that squeeze between costs and earnings.*

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**MACHINERY CO.**
666 Front Ave., N.W., Grand Rapids 4, Mich.

# 202

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## FAST FEED
## STRAIGHT LINE RIPPER

Here's why so many woodworkers standardize and recommend the 202.

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You can rip sliver edgings which will not jam.

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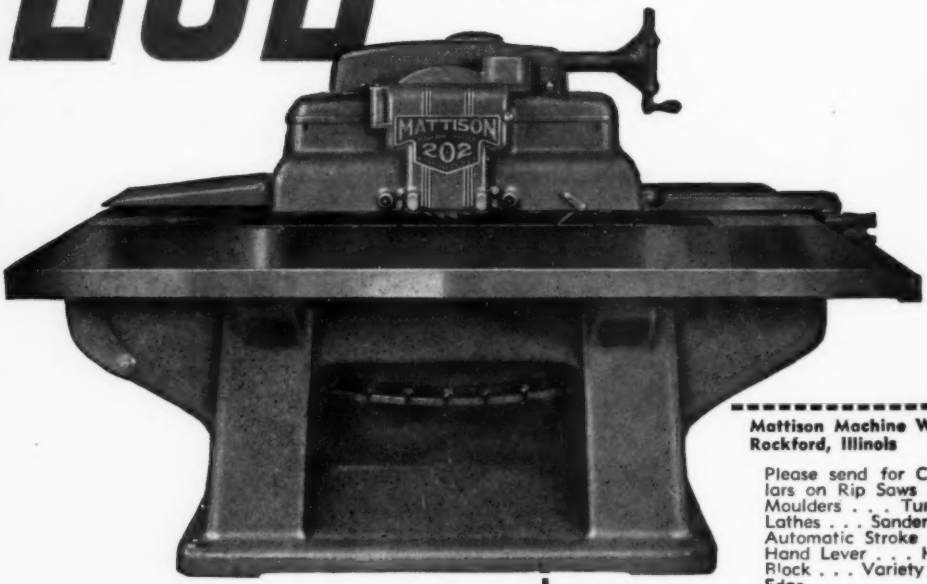


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